DOCUMENT RESUME

ED 139 930 CE 010 948

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TITLE Business Machine Maintenance. Performance Objectives. Intermediate Course.
INSTITUTION Duval County School Board, Jacksonville, Fla.
PUB DATE Aug 74
NOTE 96p.; Several illustrations may not reproduce well due to faint broken type. For a related document see CE 010 949

EDRS PRICE MF-$0.83 HC-$4.67 Plus Postage.
DESCRIPTORS *Behavioral Objectives; Career Exploration; *Criterion Referenced Tests; Curriculum Guides; *Maintenance; *Office Machines; *Repair; Secondary Education; Semiskilled Occupations; Service Occupations; Skill Development; Student Evaluation; Trade and Industrial Education

ABSTRACT

Several intermediate performance objectives and corresponding criterion measures are listed for each of 28 terminal objectives presented in this guide for an intermediate business machine maintenance course at the secondary level. (For the basic course guide see CE 010 949.) Titles of the 28 terminal objective sections are Career Opportunities, Organization, Review, Motor-Drive, Rotate Mechanism, Tilt, Keyboard, Mainspring, Shift, Cycle Clutch, Print Mechanism, Escapement, Backspace, Carrier Return, Paper Feed Mechanism, Troubleshooting Malfunction, Case, Motor, Keyboard and Entry Slide, Register, Register Inversion, Universal Bar, Credit Blance, Main Shaft and Clutch, Printing, Ribbon Advance and Reverse, Line Spacing, and Troubleshooting. (This manual and 54 others were developed for various secondary level vocational courses using the System Approach for Education (SAFE) guidelines.) (HD)

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Business Machine Maintenance

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PERFORMANCE OBJECTIVES

INTERMEDIATE COURSE

2

OE 010 945

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August, 1974

ACKNOWLEDGEMENTS

This manual was developed using System Approach For Education (SAFE) guidelines.

Appreciation and recognition are extended to the following educators who have assisted in the preparation of this manual:

Mr. Art Hilton, Coordinator
School Industry Education
Mr. Joseph Killough, Coordinator
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BUSINESS MACHINE MAINTENANCE - INTERMEDIATE

Syllabus of Terminal Performance Objectives

0.0 Curriculum Objective
26.0 Career Opportunities
27.0 Organization
28.0 Review
29.0 Moto-Drive
30.0 Rotate Mechanism
31.0 Tilt
32.0 Keyboard
33.0 Mainspring
34.0 Shift
35.0 Cycle Clutch
36.0 Print Mechanism
37.0 Escapement
38.0 Backspace
39.0 Carrier Return
40.0 Paper Feed Mechanism
41.0 Trouble-shooting Malfunction
42.0 Case
43.0 Motor
44.0 Keyboard & Entry Slide
45.0 Register
46.0 Register Inversion
47.0 Universal Bar
48.0 Credit Balance
49.0 Main Shaft & Clutch
50.0 Printing
51.0 Ribbon Advance and Reverse
52.0 Line Spacing
53.0 Troubleshooting

COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 26.0 CAREER OPPORTUNITIES

The student will demonstrate his familarity with career opportunities, student organizations, and shop safety practices by answering correctly 80% of the questions on each of the accompanying I.P.O. criterion measures.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
26.1	Given a list of job titles, the student will select with 100% accuracy the titles related to this field.	26.1	Circle those areas related to this field. a. Janitor b. Service Dispatcher c. Parts man d. Installation man e. Salesman f. Public Relations g. Shop foreman h. Service Mechanic i. Service Manager j. Secretary
26.2	Given a print out of general shop area, student will locate position of all fire extinguishers on the print out.	26.2	Mark position of fire extinguisher on print out.
26.3	The student will with 75% accuracy answer questions about student organization availabie to him.	26.3	1. Name one club especially designed for Industrial Education students. 2. What does V I C A mean? 3. Who can belong to V I C A? 4. What benefits are derived from belonging to V I C A?

COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE
OBJECTIVE NO. 27.0 — ORGANIZATION

The student will with 80% accuracy draw an organization chart, enter an initial parts order and will draw a typical inventory card for a business machine maintenance shop. The criterion measure of this I.P.O. is contained in the I.P.O. measures.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
27.1	The student will with 80% accuracy draw an organization chart of a business machine maintenance service shop. (5 man)	27.1	Draw an organization chart for a Business Machine Maintenance shop. (5 man)
27.2	The student will with 80% accuracy make up an initial parts order for a Business Machine shop with man service department.	27.2	Make up an initial parts order for a Business Machine Maintenance shop. (5 man)
27.3	The student will with 80% accuracy set up a perpetual inventory card system for a Business Machine Maintenance shop with a five man service department.	27.3	Draw a sample inventory card.

COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE
OBJECTIVE NO. 28.0 REVIEW

Upon completion of a unit of instruction, a review of the theory of operation of the Olivetti electric typewriter, the student will answer correctly 75% of the questions on a teacher made test. In addition upon being given an Olivetti electric typewriter, the student will restore to proper operating condition five desinated malfunctions within 75% accuracy as judged by attached rating scale. The criterion measure of this TPO is contained in the IPO measures:

Neatness - 15% Accuracy - 50%
Speed - 10% Selection of tools - 25%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		28.0	Test attached.
	On each of the IPO's below: Given an Olivetti electric typewriter with a specified malfunction the student will troubleshoot, repair, adjust, and/or replace parts within 75% accuracy as judged by attached rating scale.		One the Olivetti electric typewriter assigned to you, troubleshoot and repair as needed each of the specified malfunctions below to bring the machine back to operating condition.
28.1	Failure to print	28.1	Correct "failure to print"
28.2	Skipping	28.2	Correct "skipping malfunction"
28.3	Backspace	28.3	Correct "backspace malfunction"
28.4	Carriage return	28.4	Correct "carriage return"
28.5	Ribbon reverse	28.5	Correct "ribbon reverse"

COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 29.0 MOTOR DRIVE

The student will disassemble, identify and reassemble the motor drive on an IBM Selectric typewriter with 75% accuracy as judged by attached rating scale.

Selection of tools - 25%
Accuracy - 50%
Speed - 10%
Neatness - 15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		29.0	See attached test.
29.1	Given a pictoral chart of the motor drive assembly, the student will correctly identify six of eight parts.	29.1	Identify the eight parts on the attached chart.
29.2	Given an IBM Selectric typewriter, the student will remove and reinstall the motor drive with 75% accuracy.	29.2	Remove and reinstall the motor drive on an IBM Selectric typewriter. You will be graded on the following scale: Selection of tools - 25% Accuracy - 50% Speed - 10% Neatness - 15%

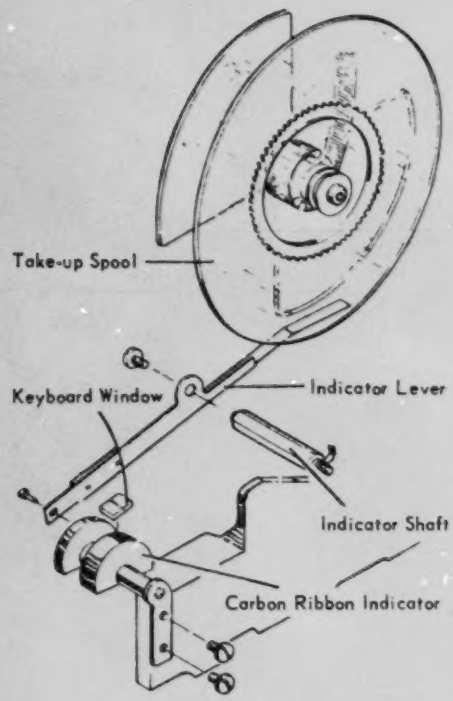

Figure 32. Carbon ribbon indicator.

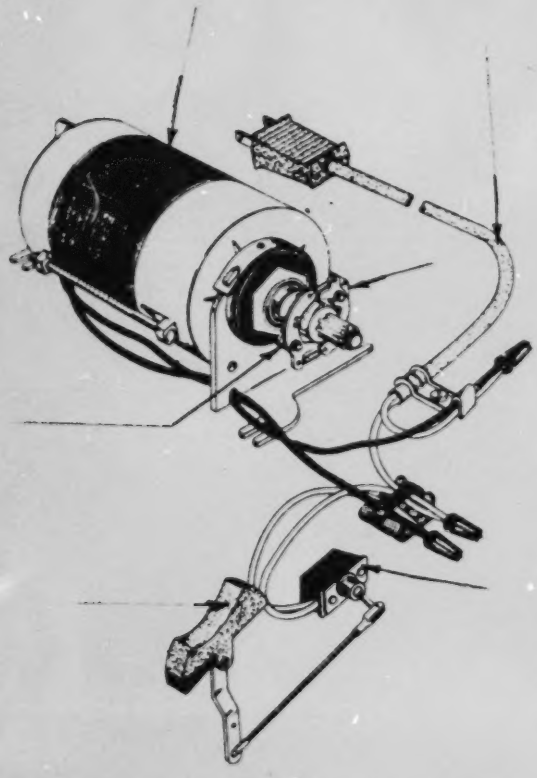

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Figure 33. Shaded pole motor.

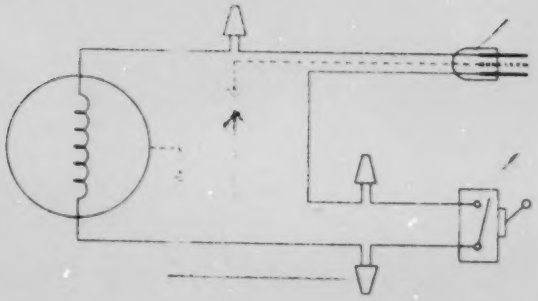


Figure 34. Shaded pole motor diagram.

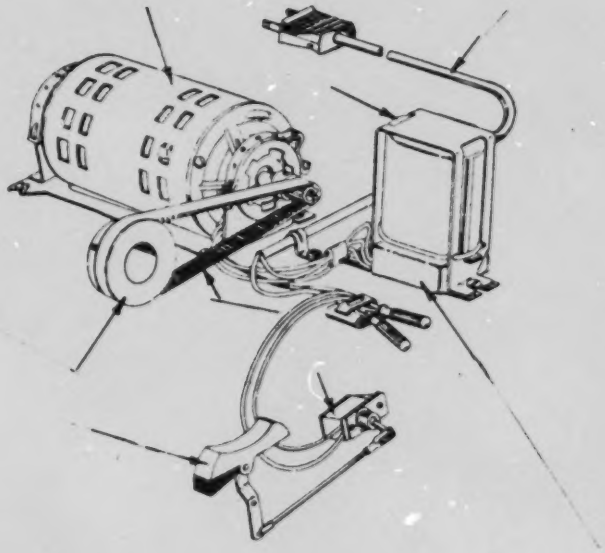
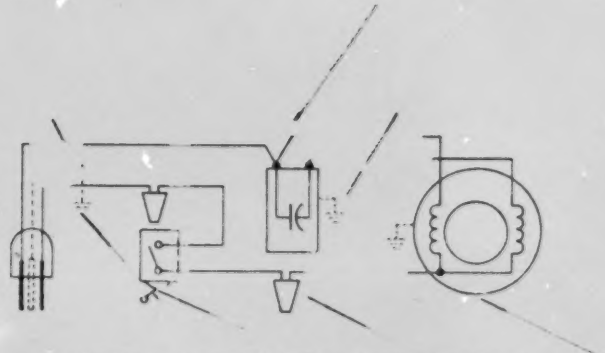


Figure 35. Capacitor-start motor.



(Courtesy of International Business Machines Corporation)

Figure 36. Capacitor-start motor diagram.

29.0 Criterion Measure

Disassemble, identify the parts, and reassemble the motor drive on an IBM selectric typewriter.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

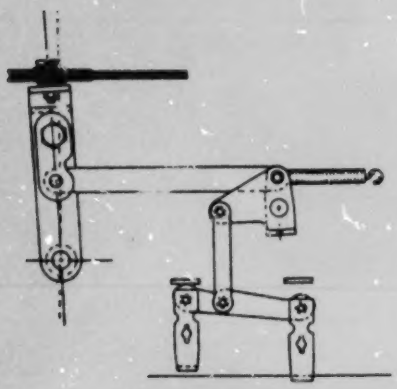
COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 30.0 ROTATE MECHANISM

The student will disassemble, identify and reassemble the rotate mechanism on an IBM Selectric typewriter with 75% accuracy as judged by attached rating scale.

Selection of tools - 25%
Accuracy - 50%
Speed - 10%
Neatness - 15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		30.0	See attached test.
30.1	Given a pictoral chart of the rotate assembly the student will correctly identify five of six parts.	30.1	Identify the six parts on the attached chart.
30.2	Given an IBM Selectric typewriter, the student will remove and reinstall the rotate mechanism with 75% accuracy.	30.2	Remove and reinstall the rotate mechanism on an IBM Selectric typewriter. You will be graded on the following scale: Selection of tools - 25% Accuracy - 50% Speed - 10% Neatness - 15%



(Courtesy of International Business Machines Corporation)

Figure 53. Tilt-1 operation.

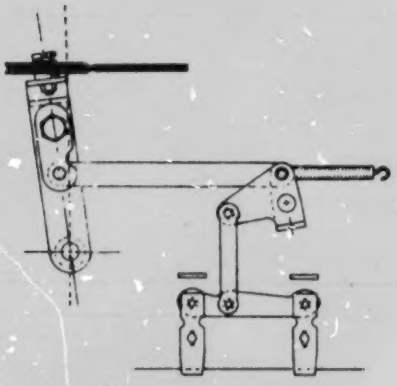


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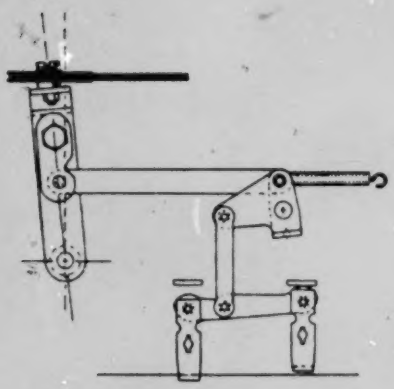
Figure 55. Tilt-3 operation.



(Courtesy of International Business Machines Corporation)

Figure 54. Tilt-2 operation.

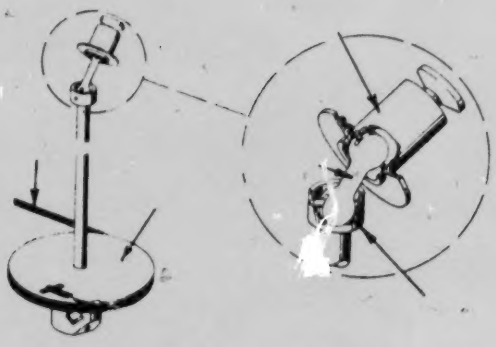


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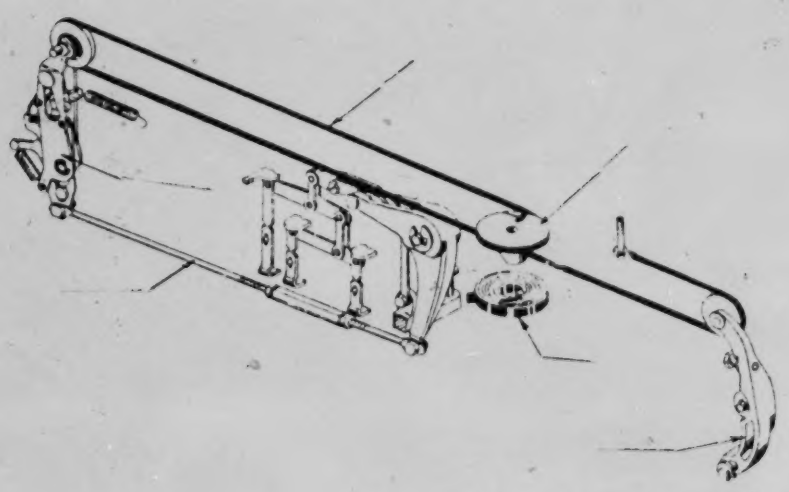
Figure 56. Rotate mechanism—rocker portion.



(Courtesy of International Business Machines Corporation)

Figure 57. Rotate tape system.

30.0 Criterion Measure

Disassemble, identify the parts, and reassemble the rotate mechanism on an IBM selectric typewriter.

You will be graded as follows:

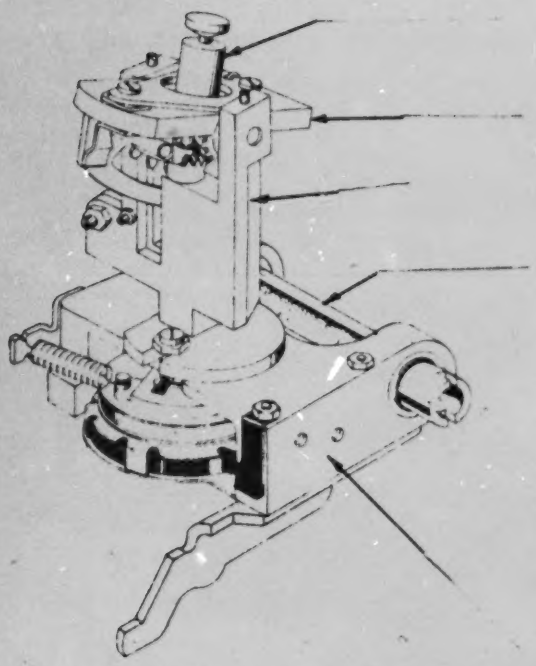
Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 31.0 TILT

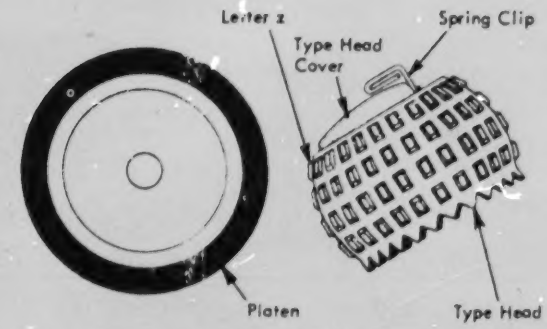
The student will disassemble, identify and reassemble the tilt mechanism on an IBM Selectric typewriter with 75% accuracy judged by attached rating scale.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		31.0	See attached test.
31.1	Given a pictoral chart of the tilt assembly the student will correctly identify seven of ten parts.	31.1	Identify the ten parts on attached chart.
31.2	Given an IBM Selectric typewriter, the student will remove and re-install the tilt mechanism with 75% accuracy.	31.2	Remove and reinstall the tilt mechanism on an IBM Selectric typewriter. You will be graded on the following scale: Selection of tools - 25% Accuracy - 50% Speed - 10% Neatness - 15%



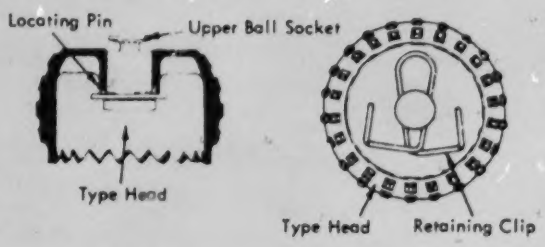
(Courtesy of International Business Machines Corporation)

Figure 43. Rocker assembly.



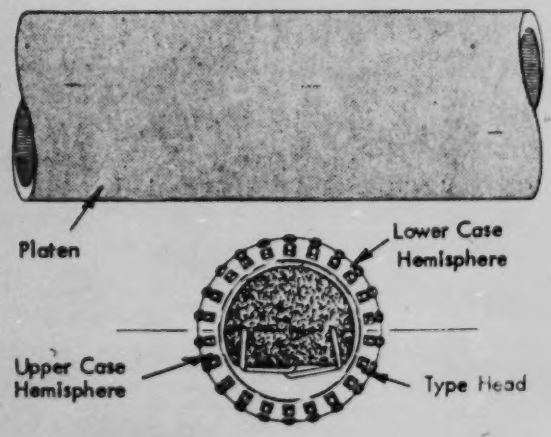
(Courtesy of International Business Machines Corporation)

Figure 45. Type head and platen—side view.



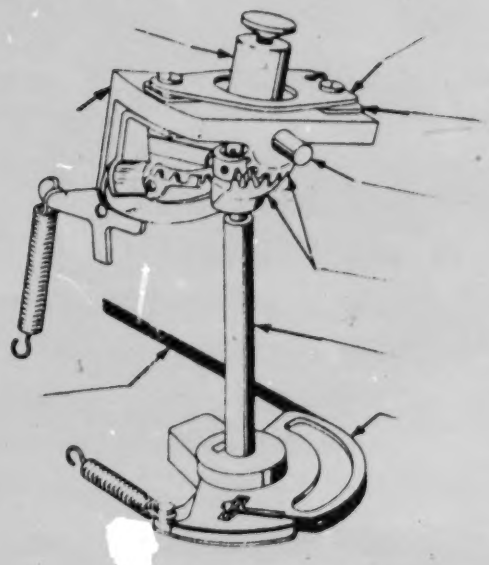
(Courtesy of International Business Machines Corporation)

Figure 46. Type head mounting.



(Courtesy of International Business Machines Corporation)

Figure 44. Type head and platen—top view.



(Courtesy of International Business Machines Corporation)

Figure 47. Tilt mechanism—rocker portion.

31.0 Criterion Measure

Disassemble, identify the parts, and reassemble the tilt mechanism on an IBM selectric typewriter.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 32.0 KEYBOARD

The student will disassemble, identify and reassemble the keyboard on an IBM Selectric typewriter with 75% accuracy as judged by attached rating scale:

Selection of tools	25%	Speed	10%
Accuracy	50%	Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		32.0	See attached test.
32.1	Given a pictorial chart of the keyboard assembly, the student will correctly identify 6 of 8 parts.	32.1	Identify the 8 parts on the attached chart.
32.2	Given an IBM Selectric typewriter the student will remove and reinstall the keyboard assembly with 75% accuracy.	32.2	Remove and reinstall the keyboard assembly on an IBM Selectric typewriter. You will be graded on the following scale: Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%

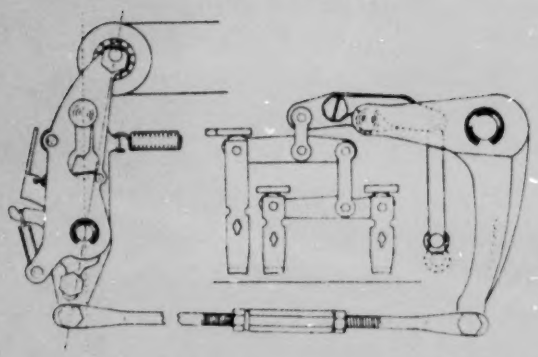


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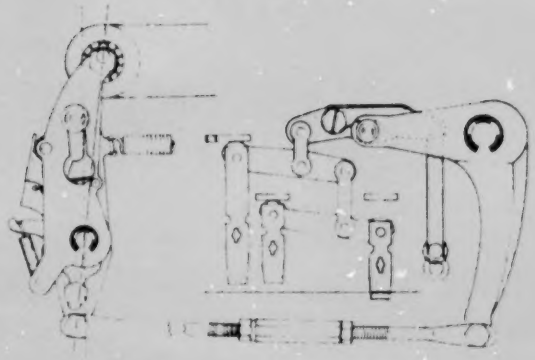
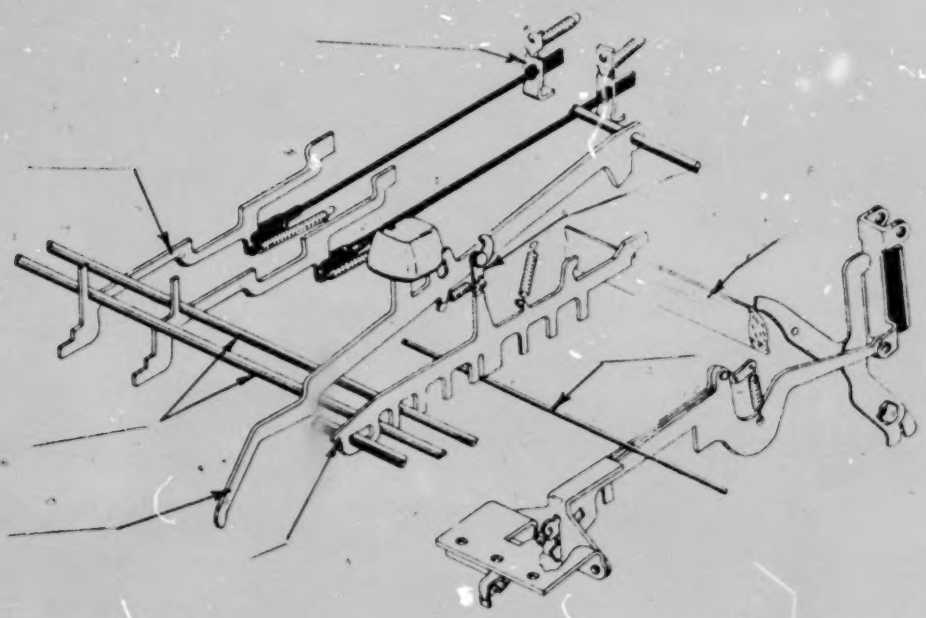
Figure 65. Negative-5 rotate operation.



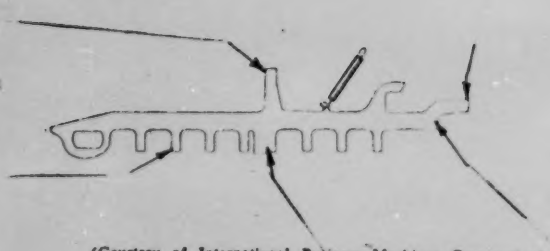
(Courtesy of International Business Machines Corporation)

Figure 66. Negative-3 rotate operation.



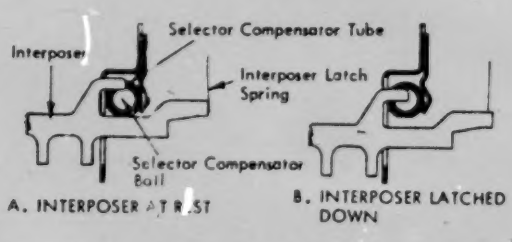
(Courtesy of International Business Machines Corporation)

Figure 67. Keyboard section and character selection.



(Courtesy of International Business Machines Corporation)

Figure 68. Selector interposer.



(Courtesy of International Business Machines Corporation)

Figure 69. Interposer latch and selector compensator.

32.0 Criterion Measure

Disassemble, identify the parts, and reassemble the keyboard on an IBM selectric typewriter.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

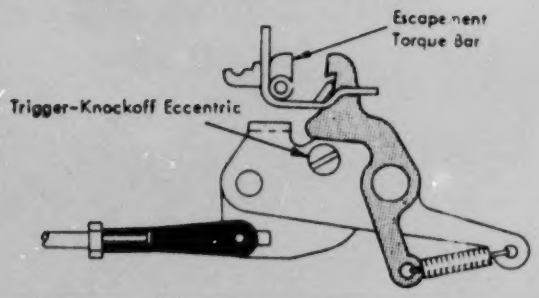
COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 33.0 — MAINSPRING

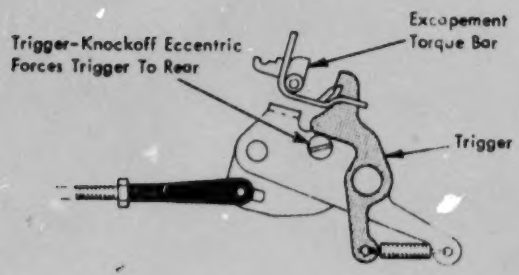
The student will disassemble, identify and reassemble the mainspring of an IBM Selectric typewriter with 75% accuracy as judged by attached rating scale.

Selection of tools	25%	Speed	10%
Accuracy	50%	Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		33.0	See attached test.
33.1	Given a pictorial chart of the mainspring assembly, the student will correctly identify 5 of 7 parts.	33.1	Identify the 7 parts on the attached chart.
33.2	Given an IBM Selectric typewriter the student will remove and reinstall the mainspring with 75% accuracy.	33.2	Remove and reinstall the mainspring on an IBM Selectric typewriter. You will be graded on the following scale: Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%



A. REST POSITION



B. ACTIVE POSITION

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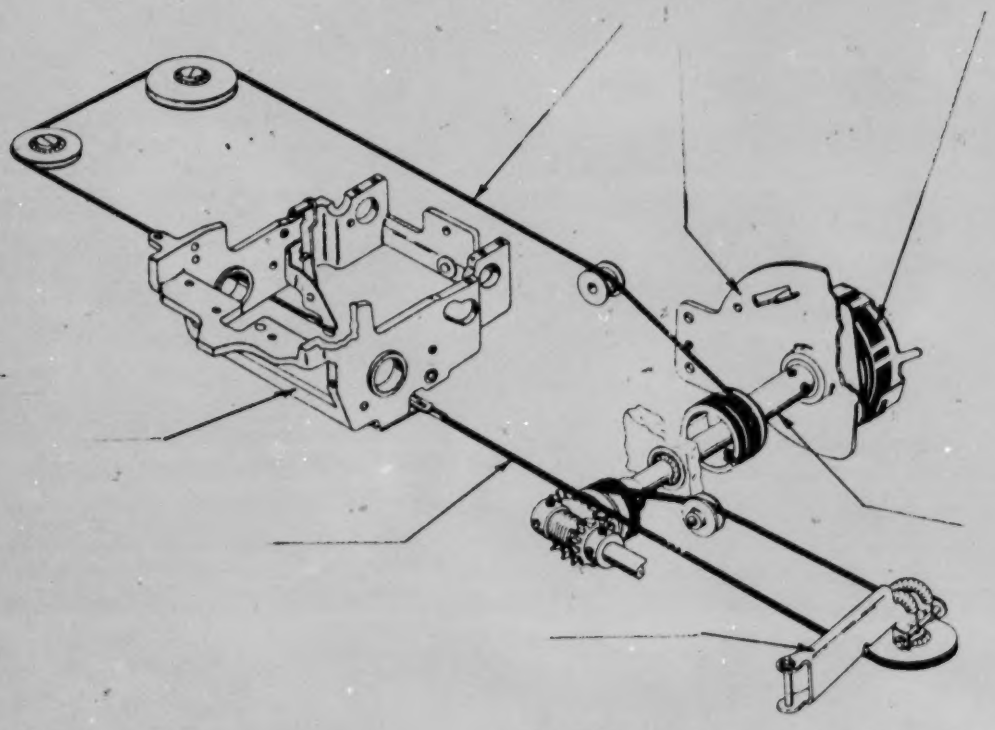
Figure 139. Escapement trigger operation (new style).



(Courtesy of International Business Machines Corporation)

Figure 140. Mainspring and cord system.

33.0 Criterion Measure

Disassemble, identify the parts, and reassemble the mainspring on an IBM selectric typewriter.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 34.0

SHIFT

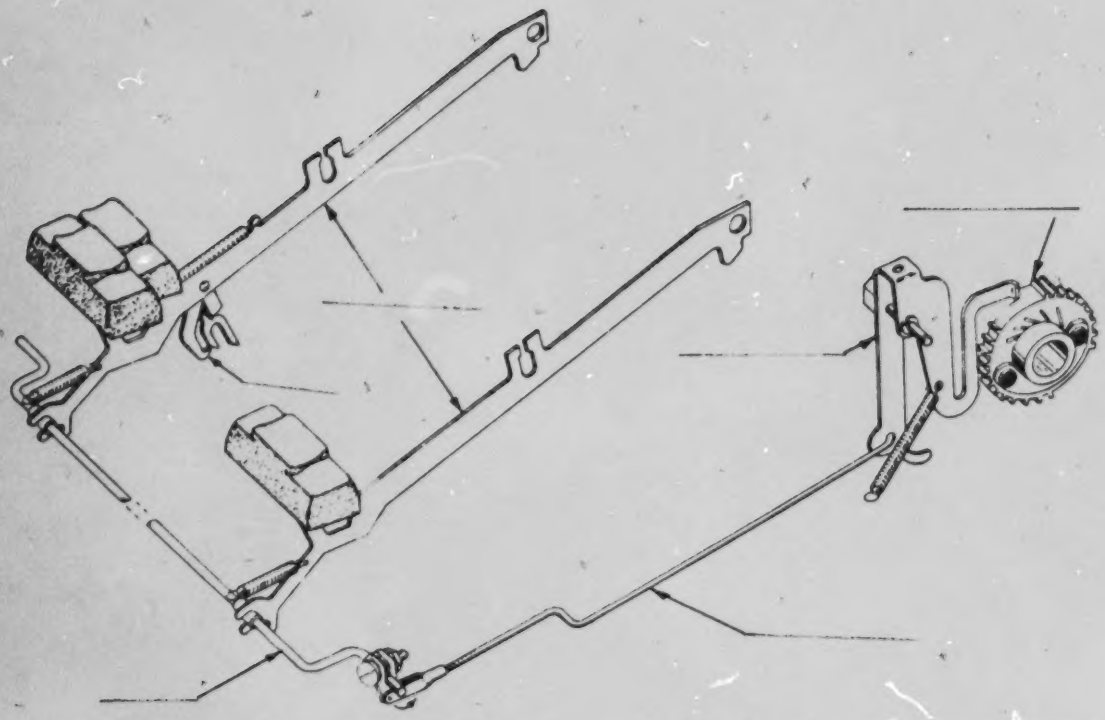
The student will disassemble, identify, and reassemble the shift on an IBM Selectric typewriter with 75% accuracy as judged by attached rating scale.

Selection of tools - 25%
Accuracy - 50%
Speed - 10%
Neatness - 15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		34.0	See attached test.
34.1	Given a pictoral chart of the shift assembly, the student will correctly identify six of eight parts.	34.1	Identify the eight parts on the attached chart.
34.2	Given an IBM Selectric typewriter, the student will remove and reinstall the shift with 75% accuracy.	34.2	Remove and reinstall the shift on an IBM Selectric typewriter. You will be graded on the following scale: Selection of tools - 25% Accuracy - 50% Speed - 10% Neatness - 15%

(Courtesy of International Business Machines Corporation)

Figure 78. Shift cam and shift arm.



(Courtesy of International Business Machines Corporation)

Figure 79. Shift release mechanism.

34.0 Criterion Measure

Disassemble, identify the parts, and reassemble the shift on an IBM selectric typewriter.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

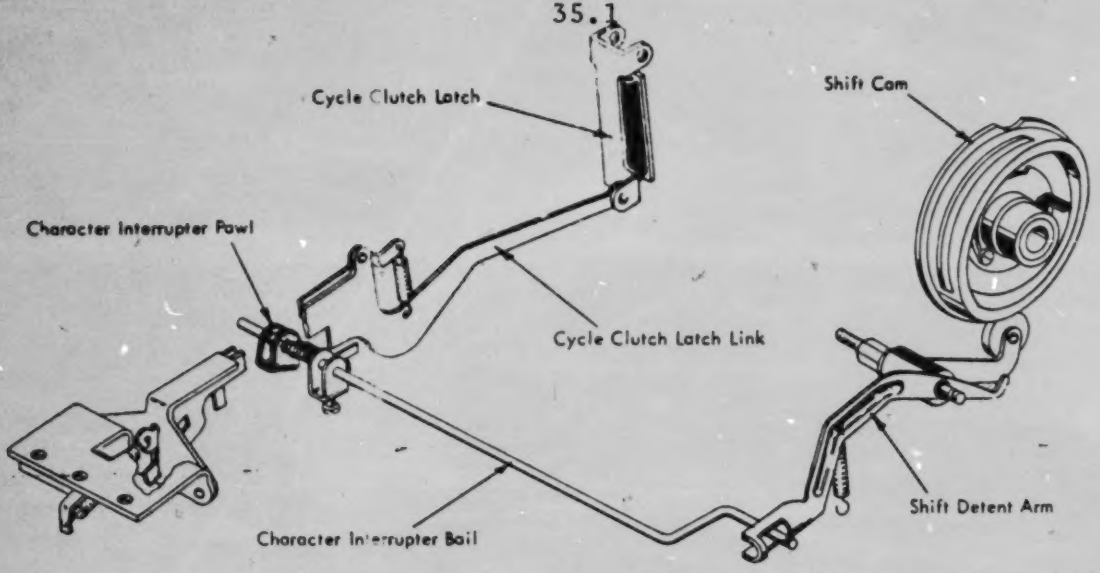
COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 35.0 — CYCLE CLUTCH

The student will disassemble, identify and reassemble the cycle clutch on an IBM Selectric typewriter with 75% accuracy as judged by attached rating scale:

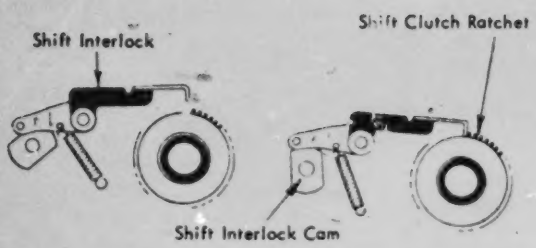
Selection of tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		35.0	See attached test.
35.1	Given a pictorial chart of the cycle clutch assembly, the student will correctly identify 7 of 9 parts.	35.1	Identify the 9 parts on the attached chart.
35.2	Given an IBM Selectric typewriter the student will remove and reinstall the cycle clutch with 75% accuracy.	35.2	Remove and reinstall the cycle clutch on an IBM Selectric typewriter. You will be graded on the following scale: Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%



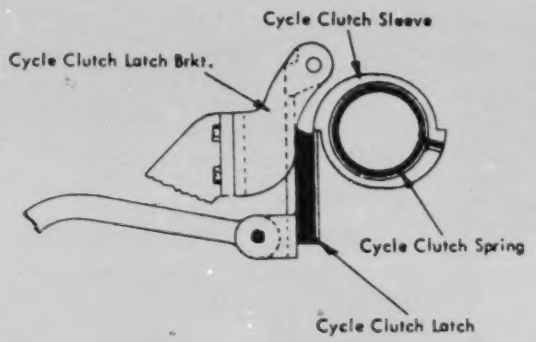
(Courtesy of International Business Machines Corporation)

Figure 85. Character interrupter.



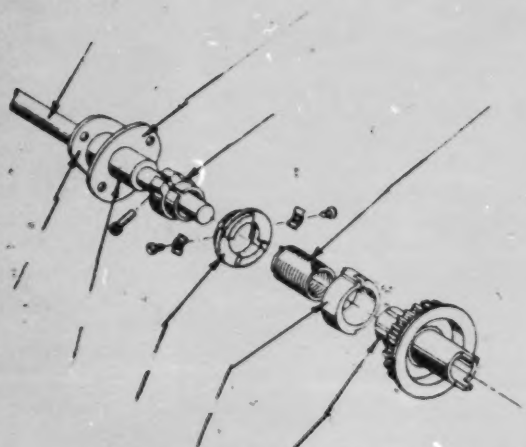
(Courtesy of International Business Machines Corporation)

Figure 86. Shift interlock.



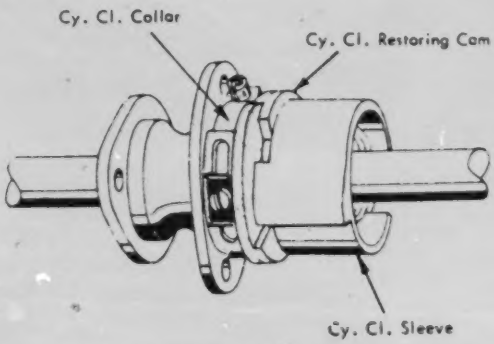
(Courtesy of International Business Machines Corporation)

Figure 88. Cycle clutch latch—side view.



(Courtesy of International Business Machines Corporation)

Figure 87. Cycle clutch—exploded view.



(Courtesy of International Business Machines Corporation)

Figure 89. Cycle clutch stop.

35.0 Criterion Measure

Disassemble, identify the parts, and reassemble the cycle clutch on an IBM selectric typewriter.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

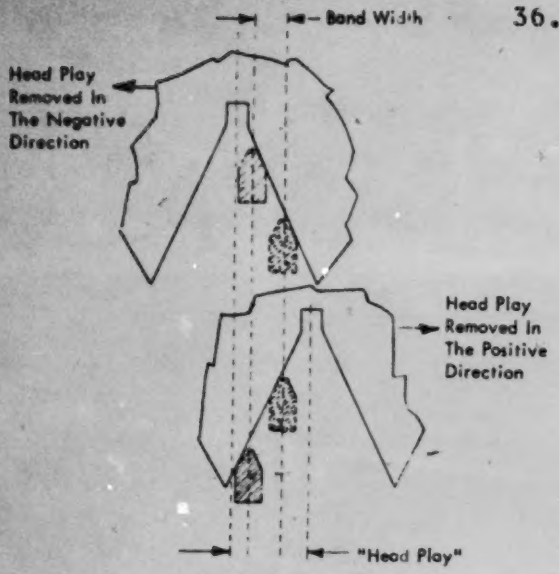
COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 36.0 PRINT MECHANISM

The student will disassemble, identify and reassemble the print mechanism on an IBM Selectric typewiter with 75% accuracy as judged by attached rating scale:

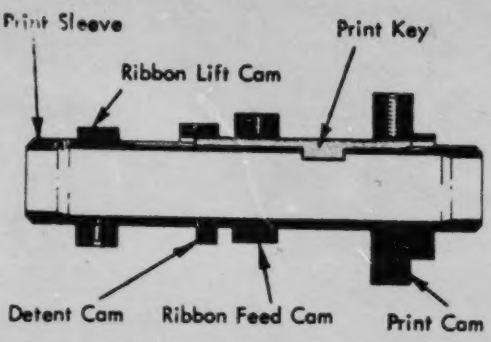
Selection of tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		36.0	See attached test.
36.1	Given a pictorial chart of the print mechanism assembly, the student will correctly identify 5 of 7 parts.	36.1	Identify the 7 parts on the attached chart.
36.2	Given an IBM Selectric typewriter the student will remove and reinstall the print mechanism with 75% accuracy.	36.2	Remove and reinstall the print mechanism on an IBM Selectric typewriter. You will be graded on the following scale: Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%



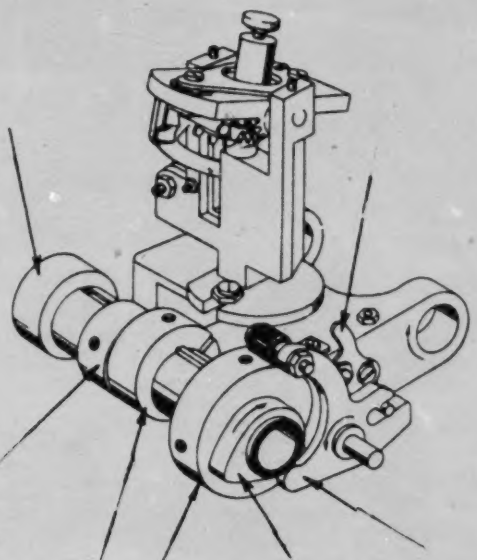
(Courtesy of International Business Machines Corporation)

Figure 113. Bandwidth.



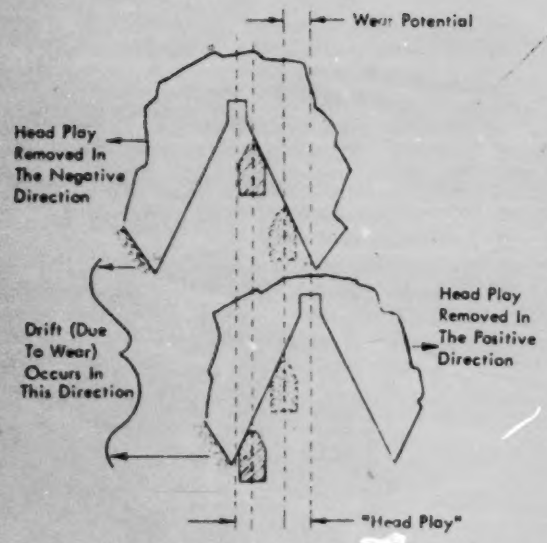
(Courtesy of International Business Machines Corporation)

Figure 115. Print sleeve and cams.



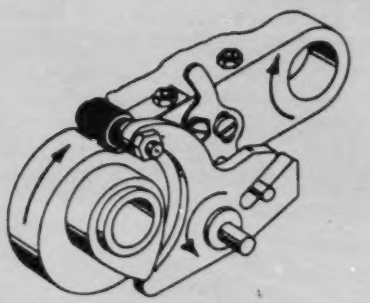
(Courtesy of International Business Machines Corporation)

Figure 116. Print mechanism.


Wear Potential
Head Play Removed In The Negative Direction
Drift (Due To Wear) Occurs In This Direction
Head Play Removed In The Positive Direction
"Head Play"

(Courtesy of International Business Machines Corporation)

Figure 114. Wear potential.



(Courtesy of International Business Machines Corporation)

Figure 117. Print cam action.

36.0 Criterion Measure

Disassemble, identify the parts, and reassemble the print mechanism on an IBM selectric typewriter.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

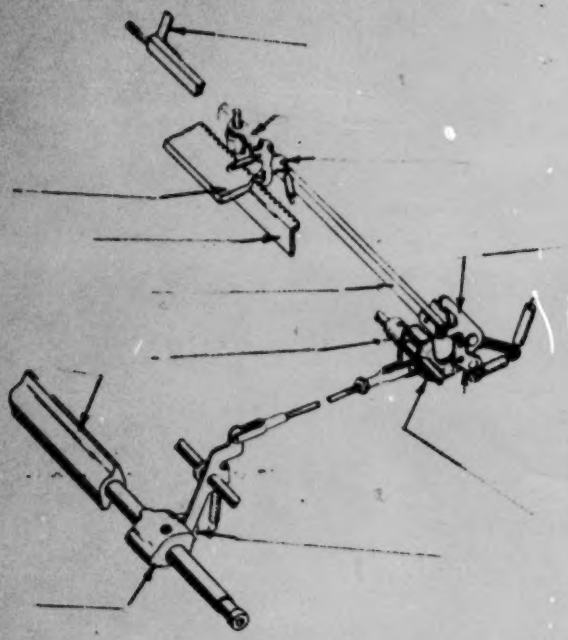
COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 37.0 ESCAPEMENT

The student will disassemble, identify and reassemble the escapement on an IBM Selectric typewriter with 75% accuracy as judged by attached rating scale:

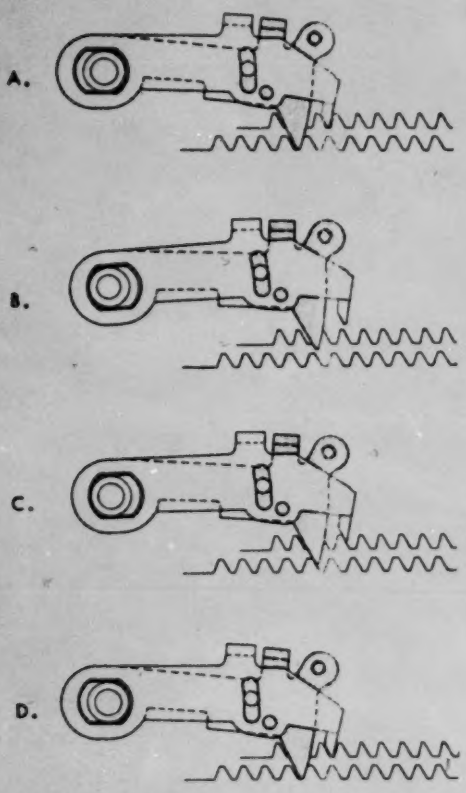
Selection of tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
37.0	Given a pictorial chart of the escapement assembly, the student will correctly identify 10 of 13 parts.	37.0 37.1	See attached test. Identify the 13 parts on the attached chart.
37.2	Given an IBM Selectric typewriter the student will remove and reinstall the escapement with 75% accuracy.	37.2	Remove and reinstall the escapement on an IBM Selectric typewriter, You will be graded on the following scale: Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%



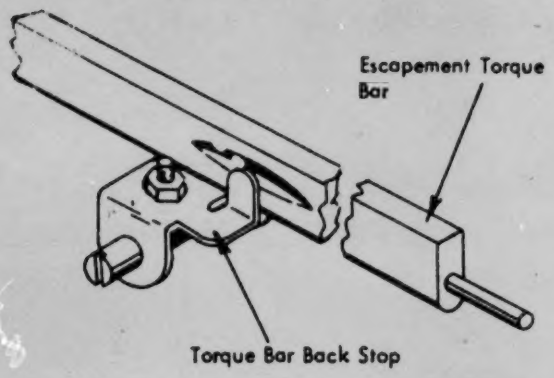
(Courtesy of International Business Machines Corporation)

Figure 135. Print escapement mechanism.



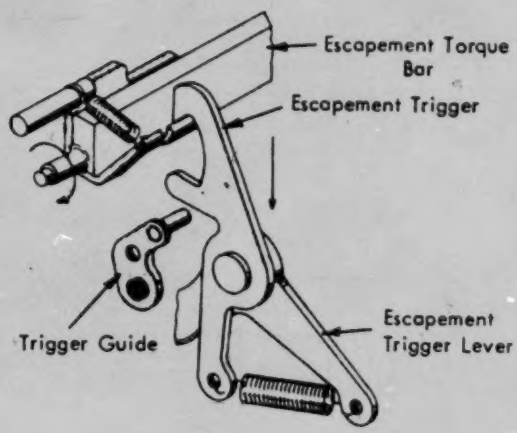
(Courtesy of International Business Machines Corporation)

Figure 136. Escapement pawl operation.

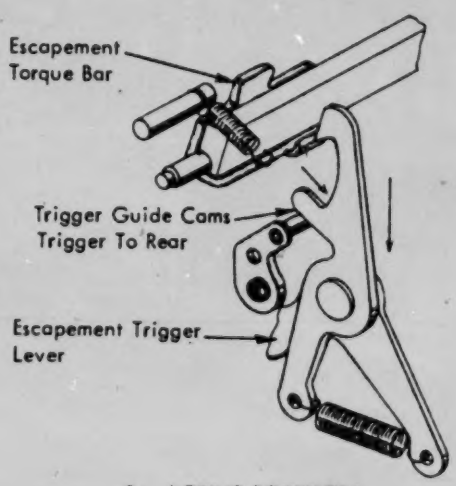


(Courtesy of International Business Machines Corporation)

Figure 137. Torque bar backspace.



A. REST POSITION



B. ACTIVE POSITION

(Courtesy of International Business Machines Corporation)

Figure 138. Escapement trigger operation (old style).

37.0 Criterion Measure

Disassemble, identify the parts, and reassemble the escapement on an IBM selectric typewriter.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

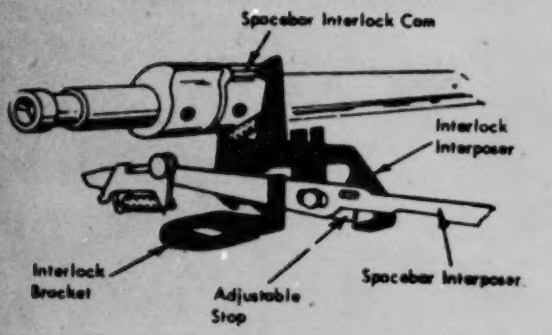
COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 38.0 BACKSPACE

The student will disassemble, identify and reassemble the backspace on an IBM Selectric typewriter with 75% accuracy as judged by attached rating scale:

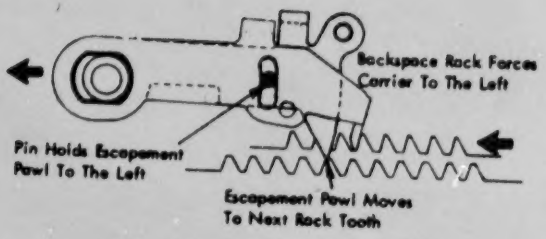
Selection of tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		38.0	See attached test.
38.1	Given a pictorial chart of the backspace assembly, the student will correctly identify 9 of 11 parts.	38.1	Identify the 11 parts on the attached chart.
38.2	Given an IBM Selectric typewriter the student will remove and reinstall the backspace mechanism with 75% accuracy.	38.2	Remove and reinstall the backspace mechanism on an IMB Selectric typewriter. You will be graded on the following scale: Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%

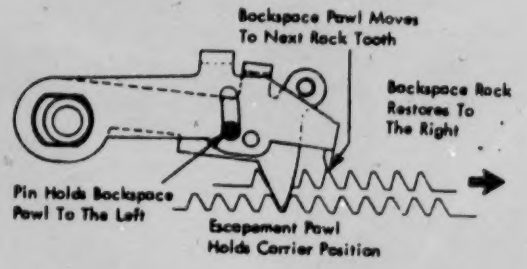


(Courtesy of International Business Machines Corporation)

Figure 158. Spacebar lockout—new style.


Backspace Rack Forces Carrier To The Left
Pin Holds Escapement Pawl To The Left
Escapement Pawl Moves To Next Rack Tooth

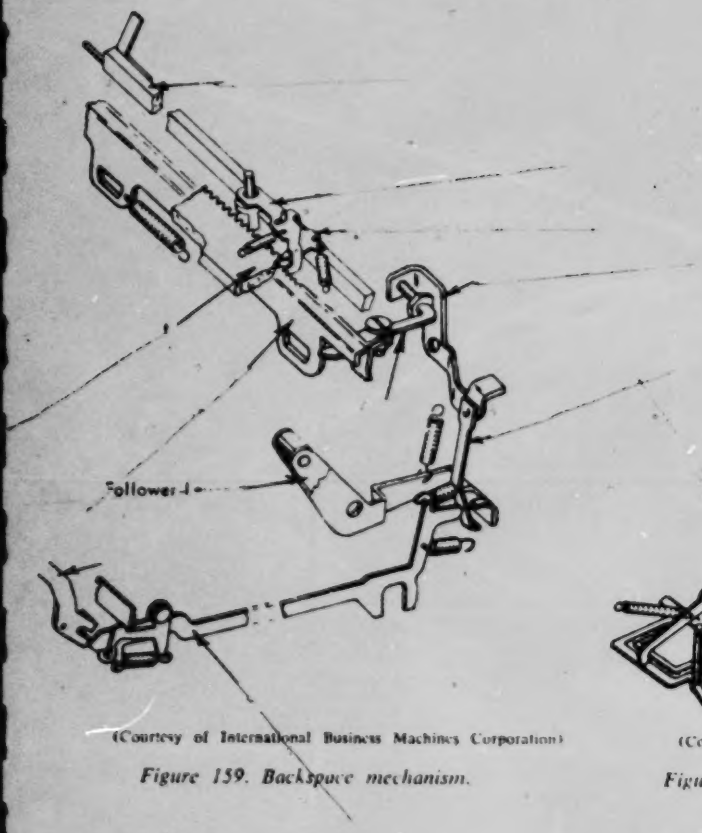
A. BACKSPACE ACTUATING STROKE


Backspace Pawl Moves To Next Rack Tooth
Backspace Rack Restores To The Right
Pin Holds Backspace Pawl To The Left
Escapement Pawl Holds Carrier Position

B. BACKSPACE RESTORING STROKE

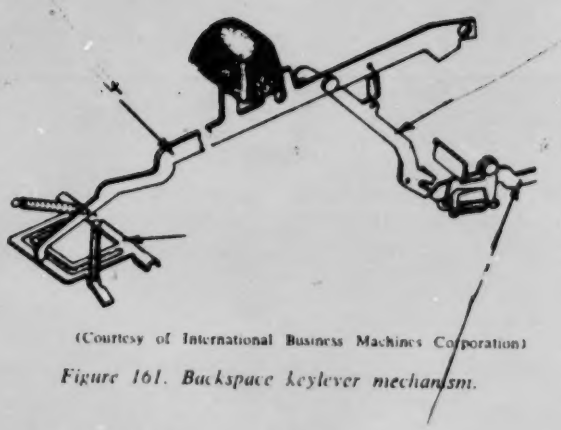
(Courtesy of International Business Machines Corporation)

Figure 160. Backspace operation.



(Courtesy of International Business Machines Corporation)

Figure 159. Backspace mechanism.



(Courtesy of International Business Machines Corporation)

Figure 161. Backspace keylever mechanism.

38.0 Criterion Measure

Disassemble, identify the parts, and reassemble the backspace on an IBM selectric typewriter.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

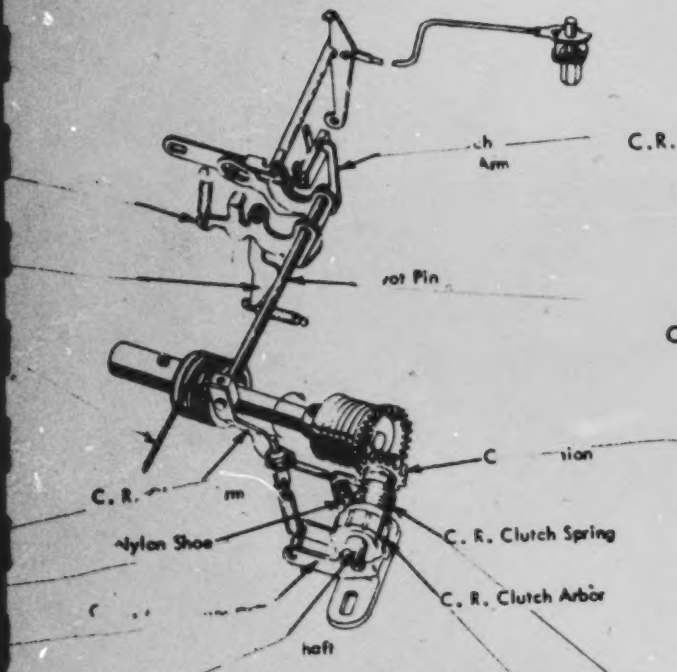
TERMINAL PERFORMANCE OBJECTIVE NO. 39.0

CARRIER RETURN

The student will disassemble, identify and reassemble the carrier return on an IBM Selectric typewriter with 75% accuracy as judged by attached rating scale:

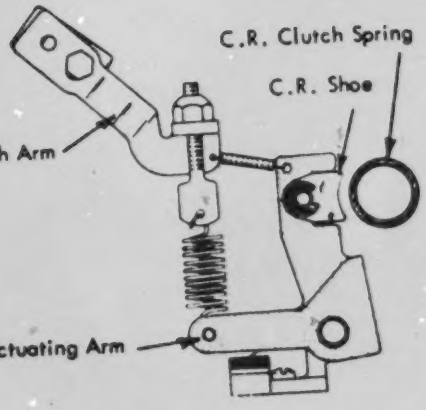
Selection of tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		39.0	See attached test.
39.1	Given a pictorial chart of the carrier return assembly, the student will correctly identify 9 of 12 parts.	39.1	Identify the 12 parts on the attached chart.
39.2	Given an IBM Selectric typewriter the student will remove and reinstall the carrier return with 75% accuracy.	39.2	Remove and reinstall the carrier return on an IBM Selectric typewriter. You will be graded on the following scale. Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%



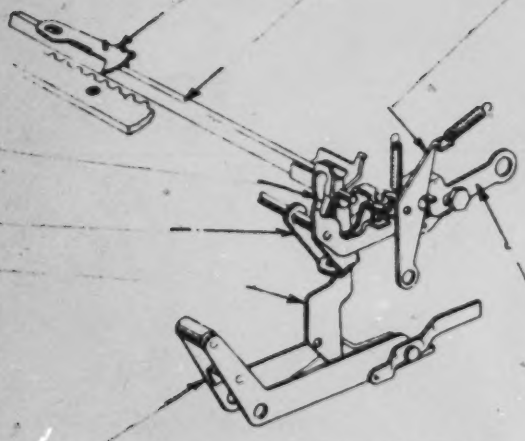
(Courtesy of International Business Machines Corporation)

Figure 162. Carrier return mechanism.



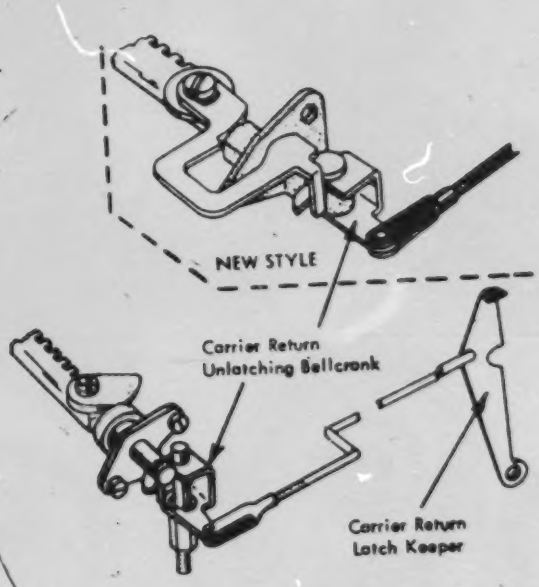
(Courtesy of International Business Machines Corporation)

Figure 164. Carrier return clutch actuating mechanism.



(Courtesy of International Business Machines Corporation)

Figure 163. Carrier return latch operation (721).



(Courtesy of International Business Machines Corporation)

Figure 165. Carrier return clutch unlatching mechanism.

39.0 Criterion Measure

Disassemble, identify the parts, and reassemble the carrier return on an IBM selectric typewriter.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

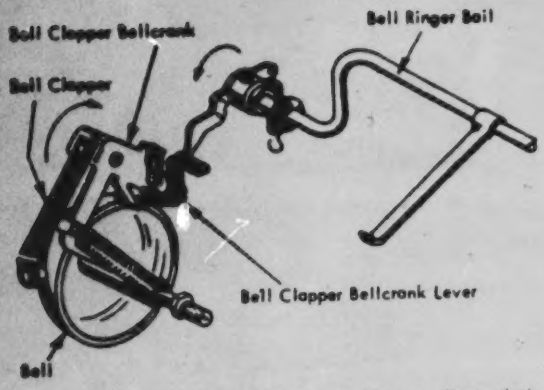
COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 40.0 PAPER FEED MECHANISM

Upon completion of the paper feed mechanism unit of instruction the student will answer 75% of the attached criterion test correctly. In addition the student will disassemble, identify and reassemble the paper feed mechanism on an IBM Selectric typewriter with 75% accuracy as judged by attached rating scale.

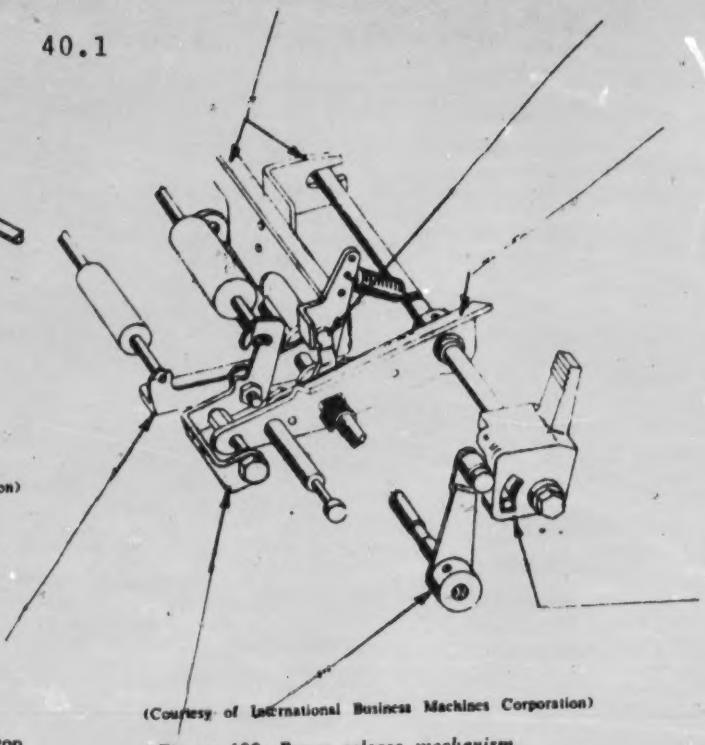
Selection of tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		40.0	Test attached.
40.1	Given a pictorial chart of the paper feed assembly, the student will correctly identity 7 of 9 parts.	40.1	Identify the 9 parts on the attached chart.
40.2	Given an IBM Selectric typewriter the student will remove and reinstall the paper feed mechanism with 75% accuracy.	40.2	Remove and reinstall the paper feed mechanism on an IBM Selectric typewriter. You will be graded on the following scale: Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%



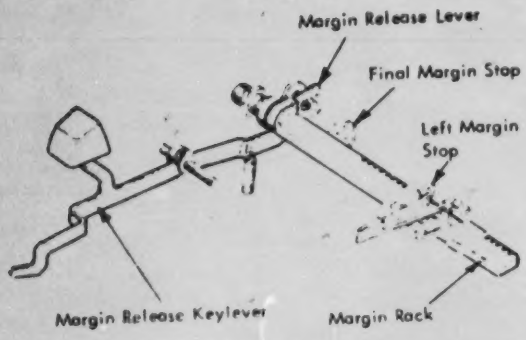
(Courtesy of International Business Machines Corporation)

Figure 196. Bellringer mechanism.



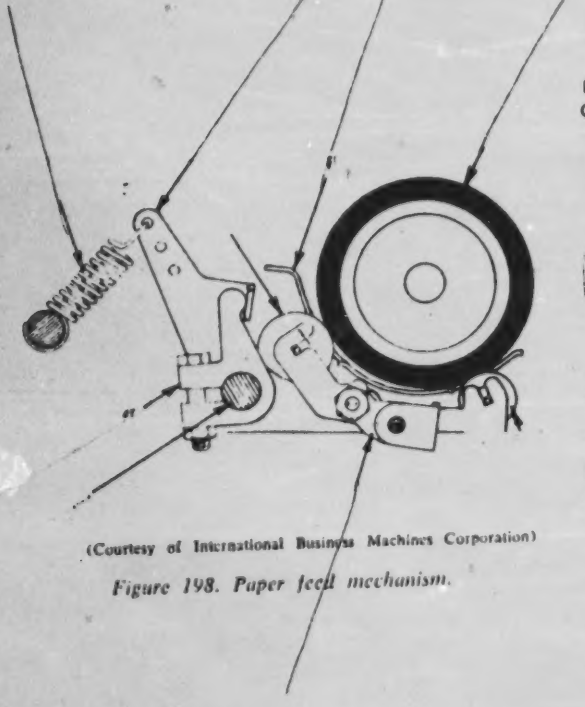
(Courtesy of International Business Machines Corporation)

Figure 199. Paper release mechanism.



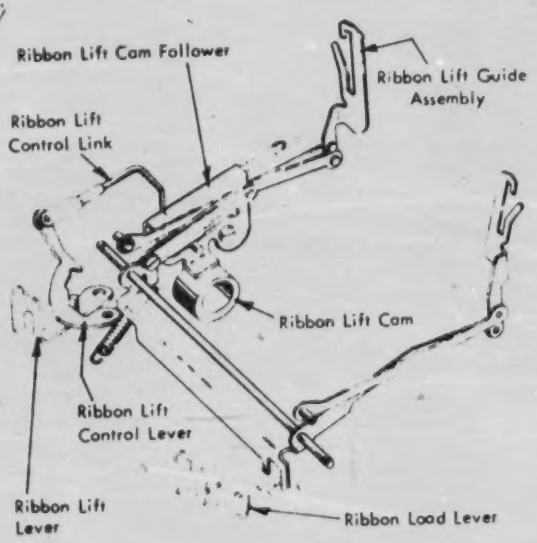
(Courtesy of International Business Machines Corporation)

Figure 197. Margin release mechanism.



(Courtesy of International Business Machines Corporation)

Figure 198. Paper feed mechanism.



(Courtesy of International Business Machines Corporation)

Figure 200. Ribbon lift mechanism.

40.0 CRITERION MEASURE

1. The purpose of the yoke on the rocker assembly on the IBM Selectric is to

   a. provide a mount for the tilt ring.
   b. prevent side play in the rocker.
   c. pivot the rocker shaft.
   d. prevent upward movement of the carrier.

2. How many characters does the type head of the IBM Selectric typewriter contain?

   a. 82
   b. 84
   c. 86
   d. 88

3. Which of the following choices is a part of the gearless tilt mechanism in figure 49 of the Supplementary Material, but is not shown in the rocker portion in figure 47?

   a. Tilt pulley
   b. Link
   c. Tilt tape
   d. Tilt ring

4. What is designed into the drive system of the IBM Selectric to insure that the motor will start under a heavy load?

   a. A positive-drive belt.
   b. An eight-toothed pulley.
   c. A centrifugal clutch.
   d. A clutch pulley hub.

5. Which of the following choices is not a powered operation on the IBM Selectric?

   a. Spacebar.
   b. Backspace.
   c. Carrier return.
   d. Tabulator.

6. Activation of the cycle clutch on the IBM Selectric is begun by the
   a. downward movement of the interposer.
   b. depression of a keylever.
   c. cycle clutch link spring.
   d. cycle clutch bail.

7. The rotate mechanism must position the type head to

   a. 4 positions.
   b. 4 band.
   c. cycle clutch link spring.
   d. cycle clutch bail.

8. Refer to figure 73 in the Supplementary Material. The new cycle clutch latch on the IBM Selectric is restored by the

   a. cycle clutch bail.
   b. cycle clutch sleeve.
   c. restoring cam follower.

9. If the tab lever on the IBM Selectric were to latch to the rear during a carrier return operation, then the

   a. carrier would lock.
   b. lever would break.
   c. machine would stall.
   d. machine would operate normally

10. What part of the IBM Selectric contacts the bellringer bell-crank to ring the bell?

   a. Line lock bracket.
   b. Right margin stop.
   c. Left margin stop.
   d. Tab lever bracket.

11. In order that the backspace operation latch on the IBM Selectric may rotate freely, it is mounted to the horizontal arm of the backspace bellcrank by a

   a. tension spring.
   b. horizontal lug.
   c. setscrew.
   d. ball-shouldered rivet.

12. The stick shift on the IBM Selectric is used to change

   a. automatic velocity control.
   b. the movement of the carrier.
   c. type head velocity.
   d. the relationship between striker and anvil.

13. The characters on the IBM Selectric type head slightly emboss the paper due to the

   a. density of the platen.
   b. free flight of the type head.
   c. size of the character.
   d. anvil and striker.

14. The platen ratchet on the IBM Selectric normally provides for typing at how many lines per inch?

   a. 4
   b. 5
   c. 6
   d. 7

15. What happens during a keylever operation on the IBM Selectric as the interposer latches down?

15. Con't.
    a. The cycle ball trips the cycle clutch pawl.
    b. A lug on the bottom of the interposer forces the cycle clutch latch pawl up.
    c. The cycle clutch pawl resets on its keeper.
    d. The cycle clutch latch swings into the path of the cycle clutch sleeve.

16. The shift interlock on the IBM Selectric comes into play during a print operation to

    a. lock the type head in position.
    b. lock the interposers.
    c. prevent parts damage.
    d. prevent selection error.

17. The maximum number of rotations and tilts needed to reach any character on the type head of the IBM Selectric is

    a. 4 rotations and 3 tilts.
    b. 5 rotations and 3 tilts.
    c. 4 rotations and 4 tilts.
    d. 3 rotations and 5 tilts.

18. If the tilt mechanism on the IBM Selectric does not supply the proper amount of motion to the tilt ring for a given tilt selection, the condition is corrected by the

    a. yoke
    b. V-shaped
    c. tilt detent
    d. tilt pulley link

19. When both tilt latches on the IBM Selectric are operated, the result is three character bands of tilt. Which character band is then in the print position?

    a. 1
    b. 2
    c. 3
    d. 4

20. How many of the rotate differential latches are used to effect a positive three rotate operation?

    a. 1
    b. 2
    c. 3

21. Each time a shift key is depressed, the type head on the IBM Selectric should rotate through

    a. 360 in a clockwise direction.
    b. 180 in a clockwise direction.
    c. 360 in a counterclockwise direction.
    d. 180 in a counterclockwise direction.

22. Detent timing on the IBM Selectric is accurately set when the

22. Con't.

a. print shaft is timed with the cycle shaft.
b. detends begin to withdraw just before the type head prints.
c. rotate detent engages the type head as soon as possible before the type head restores.
d. compensator assist spring applies no pressure against the nylon roller.

23. The selector compensator's main function on the IBM Selectric is to

a. block the downward movement of the interposers.
b. insure that only one interposer at a time is in operation.
c. select which interposer to accept.
d. prevent more than one key at a time from being depressed.

24. The ribbon lift motion for the film ribbon lift on the IBM Selectric is supplied by a

a. spring
b. clutch
c. ratchet
d. cam

25. Automatic velocity selection on the IBM Selectric is accomplished by

a. changing impression control.
b. a dual print cam.
c. impression springs.
d. control links.

26. The purpose of the torque bar on the IBM Selectric is to

a. limit the movement of the rack.
b. lift the escapement trigger.
c. hold the escapement trigger down.
d. trip the pawls out of their racks.

27. The margin release of the IBM Selectric operates by

a. lifting the margin stops.
b. shifting the margin stops to the right.
c. shifting the margin stops to the left.
d. pushing the margin stops down.

28. The ribbon feed pawl on the IBM Selectric gets its driving power from the ribbon feed cam, and it gets its return power from a

28. Con't.

a. cam follower.
b. return link.
c. return eccentric.
d. return spring.

29. Which of the following choices describes, the character yield per spool of 3121 polyethylene film ribbon used on the Model 71 Selectric?

a. 50,000
b. 51,000
c. 52,000
d. 53,000

30. The primary purpose of the cam followers on the IBM Selectric is to

a. stop the cam's motion.
b. convert rotary motion to linear motion.
c. start the cam's motion.
d. stop the cam from rebounding.

31. The speed of the carrier on the IBM Selectric is controlled during tabulation by a

a. spring clutch.
b. brake shoe.
c. centrifugal clutch.
d. pneumatic governor.

32. The ribbon feed and lift operations on the IBM Selectric are locked out by a

a. carrier pointer.
b. feed pawl.
c. stencil lever.
d. hairpin spring.

40/0 Criterion Measure

Disassemble, identify the parts, and reassemble the paper feed mechanism on an IBM selectric typewriter.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

COURSE BUSINESS MACHINE MEINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 41.0

~~Troubleshooting~~ Malfunctions

Given an IBM Selectric typewriter, the student will diagnose, troubleshoot, and restore to proper operating condition 15 designated malfunctions within 75% accuracy as judged by attached rating scale. The criterion measure of this TPO is contained in the IPO measures.

Neatness of work	15%
Speed	10%
Accuracy	50%
Selection of tools	25%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
	On each of IPO's below: Given an IBM Selectric typewriter with a specified malfunction, the student will troubleshoot, repair, adjust and/or replace parts within 75% accuracy as judged by attached rating scale.		
41.1	Failure to print	41.1	Correct "failure to print"
41.2	Motor will not run	41.2	Correct "motor will not run"
41.3	Repeating keys	41.3	Correct "repeating keys"
41.4	Faint print	41.4	Correct "faint print"
41.5	Failure to space	41.5	Correct "failure to space"
41.6	Ribbon lift	41.6	Correct "ribbon lift"
41.7	Ribbon drive	41.7	Correct "ribbon drive"
41.8	Skipping	41.8	Correct "skipping'
41.9	Motion	41.9	Correct "motion"
41.10	Type on feet	41.10	Correct "type on feet"
41.11	Ring and platen	41.11	Correct "ring and platen"
41.12	Space bar repeat	41.12	Correct "space bar repeat
41.13	Backspace	41.13	Correct "backspace"
41.14	Banking	41.14	Correct "banking"
41.15	Carrier return	41.15	Correct "carrier return"
			Neatness of work 15%
			Speed 10%
			Accuracy 50%
			Selection 25%

COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 42.0

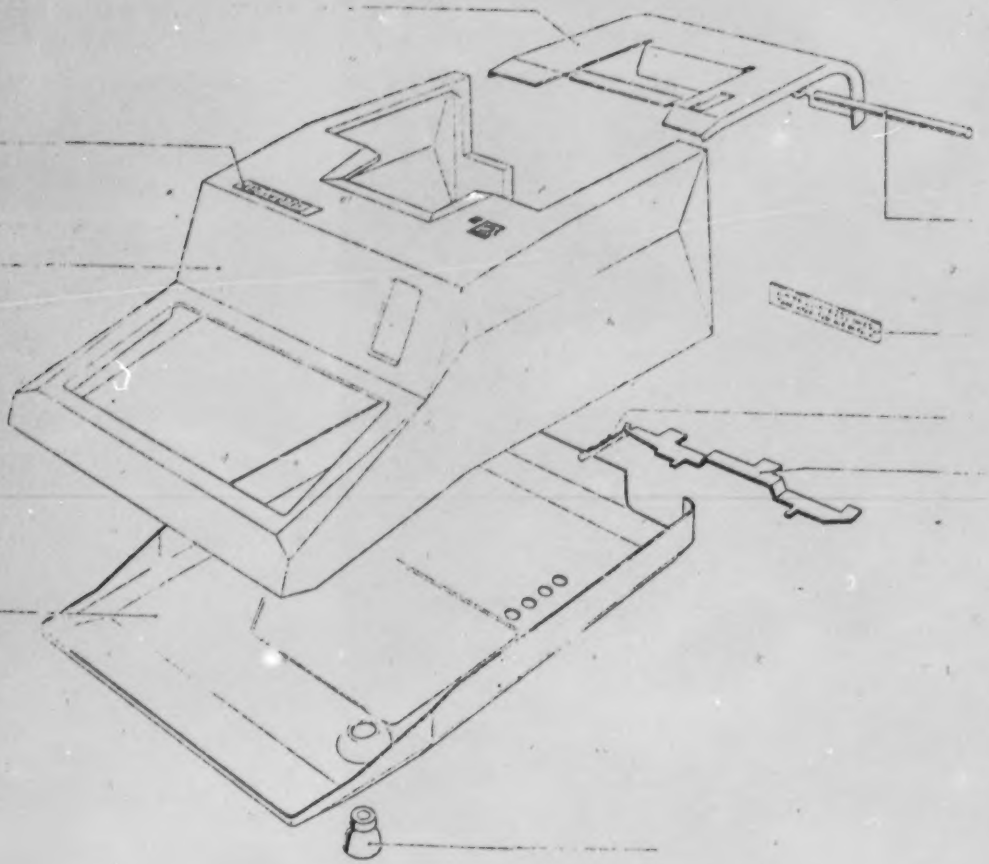
CASE

The student will disassemble, identify, and reassemble the case (cover) of an Olivetti adding machine with 75% accuracy as judged by attached rating scale.

Selection of tools - 25%
Accuracy - 50%
Speed - 10%
Neatness - 15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		42.0	See attached test.
42.1	Given a pictoral chart of the casing assembly the student will correctly identify seven of nine parts.	42.1	Identify the nine parts on the attached chart.
42.2	Given an olivetti adding machine the student will remove and reinstall the casing with 75% accuracy.	42.2	Remove and reinstall the casing on an olivetti adding machine. You will be graded on the following scale: Selection of tools: 25% Accuracy 50% Speed 10% Neatness 15%

42.1



42.0 Criterion Measure

Diasassemble, identify the parts, and reassemble the case of an Olivetti adding machine.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 43.0 MOTOR

The student will disassemble, identify, and reassemble the motor on an Olivetti adding machine with 75% accuracy as judged by attached rating scale.

Selection of tools:	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		43.0	See attached test.
43.1	Given a pictorial chart of the motor assembly, the student will correctly identify 21 of 27 parts.	43.1	Identify the 27 parts on the attached chart.
43.2	Given an Olivetti adding machine the student will remove and reinstall the motor with 75% accuracy.	43.2	Remove and reinstall the motor on an Olivetti adding machine. You will be graded on the following scale. Selection of tools: 25% Accuracy 50% Speed 10% Neatness 15%

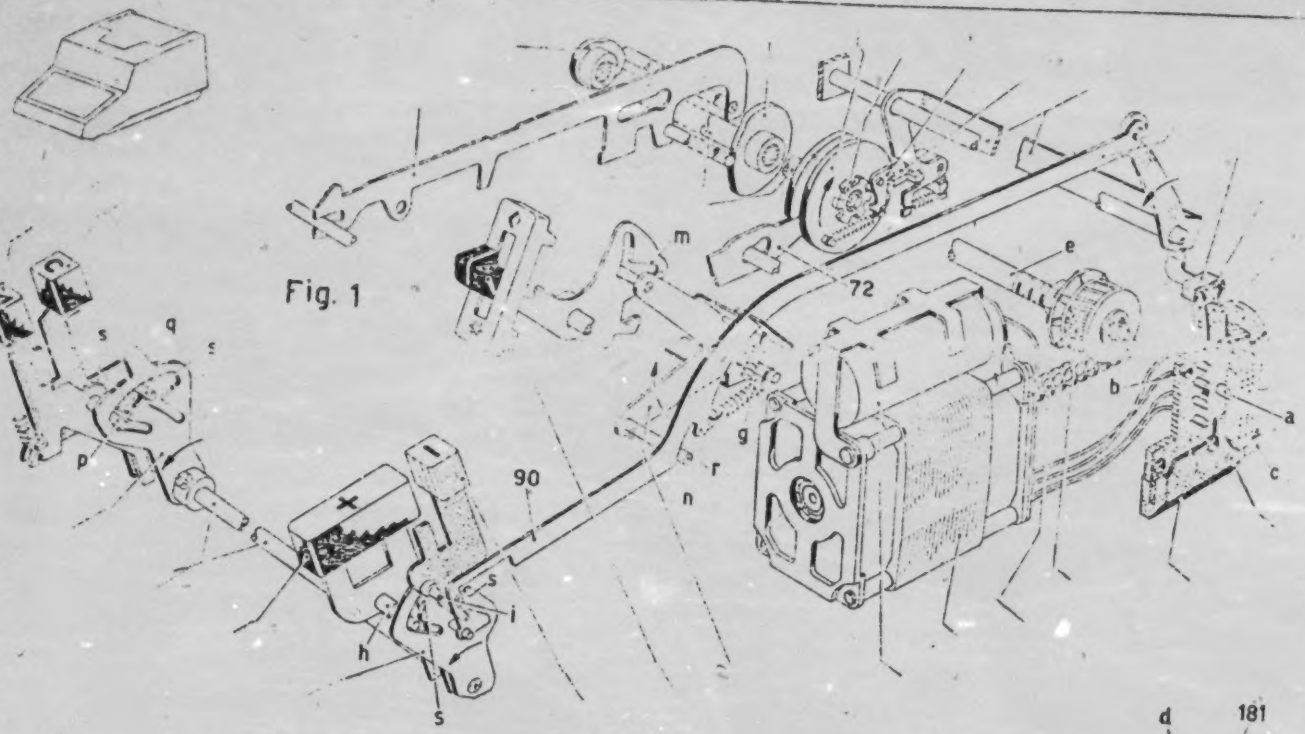


Fig. 1
m
e
72
b
a
c
g
r
n
90
s
i
h
s
p
q
s
A
C
+
Fig. 2
d
181
98
185
92
93
c
94
97
187
186
182
160a
180b
Fig. 3
85
183
95
e
57
86
183
184
Fig. 4
e
85
87
88
f
86

43.0 Criterion Measure

Disassemble, identify the parts, and reassemble the motor on an Olivetti adding machine.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 44.0

KEYBOARD & ENTRY SLIDE

The student will disassemble, identify, and reassemble the keyboard & entry slide on an Olivetti adding machine with 75% accuracy as judged by attached rating scale.

Selection of tools:	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		44.0	See attached test.
44.1	Given a pictorial chart of the assembly, the student will correctly identify 12 of 17 parts.	44.1	Identify the 17 parts on the attached chart.
44.2	Given an Olivetti adding machine, the student will remove and reinstall the entry slide with 75% accuracy.	44.2	Remove and reinstall the entry slide on an Olivetti adding machine. You will be graded on the following scale: Selection of tools: 25% Accuracy 50% Speed 10% Neatness 15%

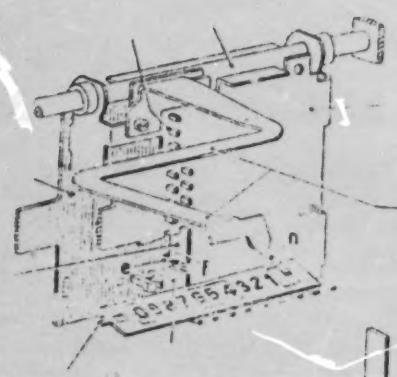


Fig. 2

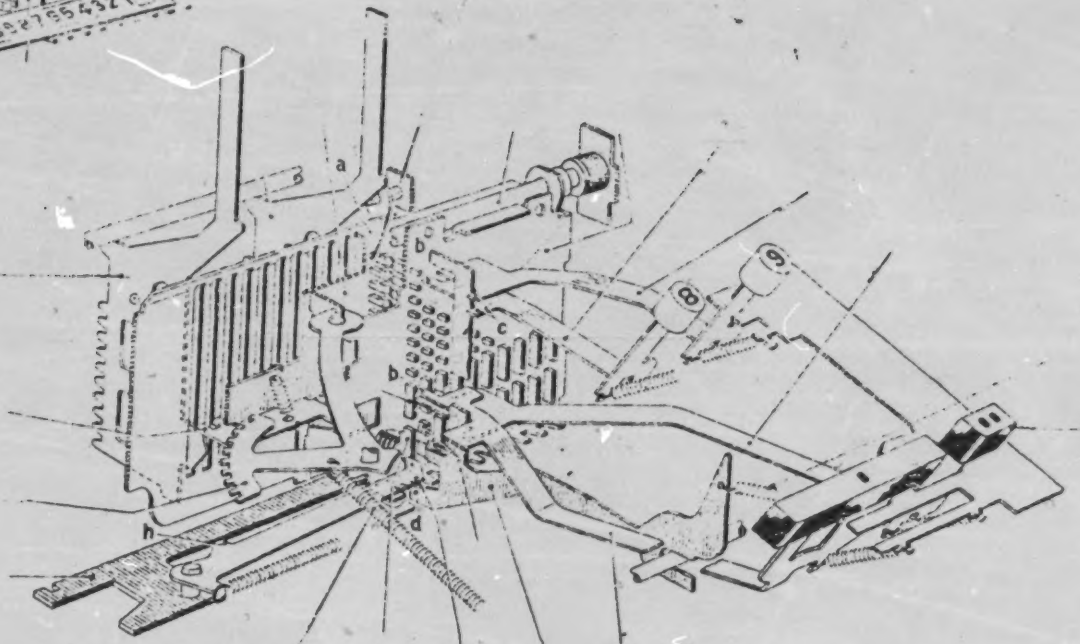


Fig. 1

44.0 Criterion Measure

Disassemble, identify the parts, and reassemble the keyboard & entry slide on an Olivetti adding machine.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 45.0

REGISTER

The student will disassemble, identify and reassemble the register on an Olivetti adding machine with 75% accuracy as judged by attached rating scale.

Selection of Tools:	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		45.0	See attached test.
45.1	Given a pictorial chart of the assembly, the student will correctly identify 13 of 18 parts.	45.1	Identify the 18 parts on the attached chart.
45.2	Given an Olivetti adding machine the student will remove and reinstall the register with 75% accuracy.	45.2	Remove and reinstall the Register on an Olivetti adding machine. You will be graded on the following scale: Selection of tools: 25% Accuracy 50% Speed 10% Neatness 15%

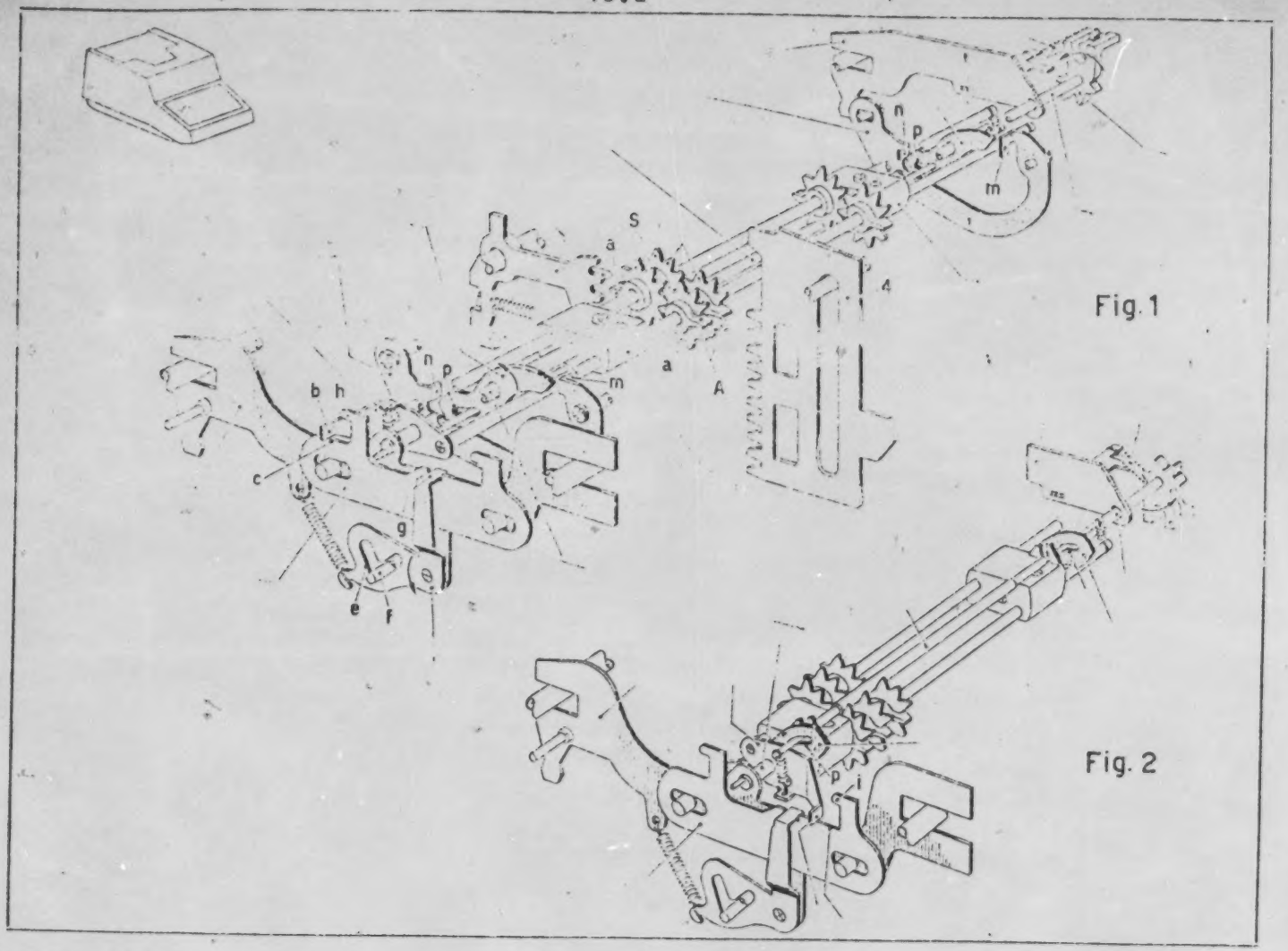


Fig. 1

Fig. 2

45.0 Criterion Measure

Disassemble, identify the parts, and reassemble the register on an Olivetti adding machine.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 46.0

REGISTER INVERSION

The student will disassemble, identify, and reassemble the Register inversion assembly on an Olivetti adding machine with 75% accuracy as judged by attached rating scale.

Selection of tools:	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		46.0	See attached test.
46.1	Given a pictorial chart of the Register inversion assembly, the student will correctly identify 13 of 18 parts.	46.1	Identify the 18 parts on the attached chart.
46.2	Given an Olivetti adding machine the student will remove and reinstall the inversion crank with 75% accuracy.	46.2	Remove and reinstall the inversion crank on an olivetti adding machine. You will be graded on the following scale: Selection of tools: 25% Accuracy 50% Speed 10% Neatness 15%

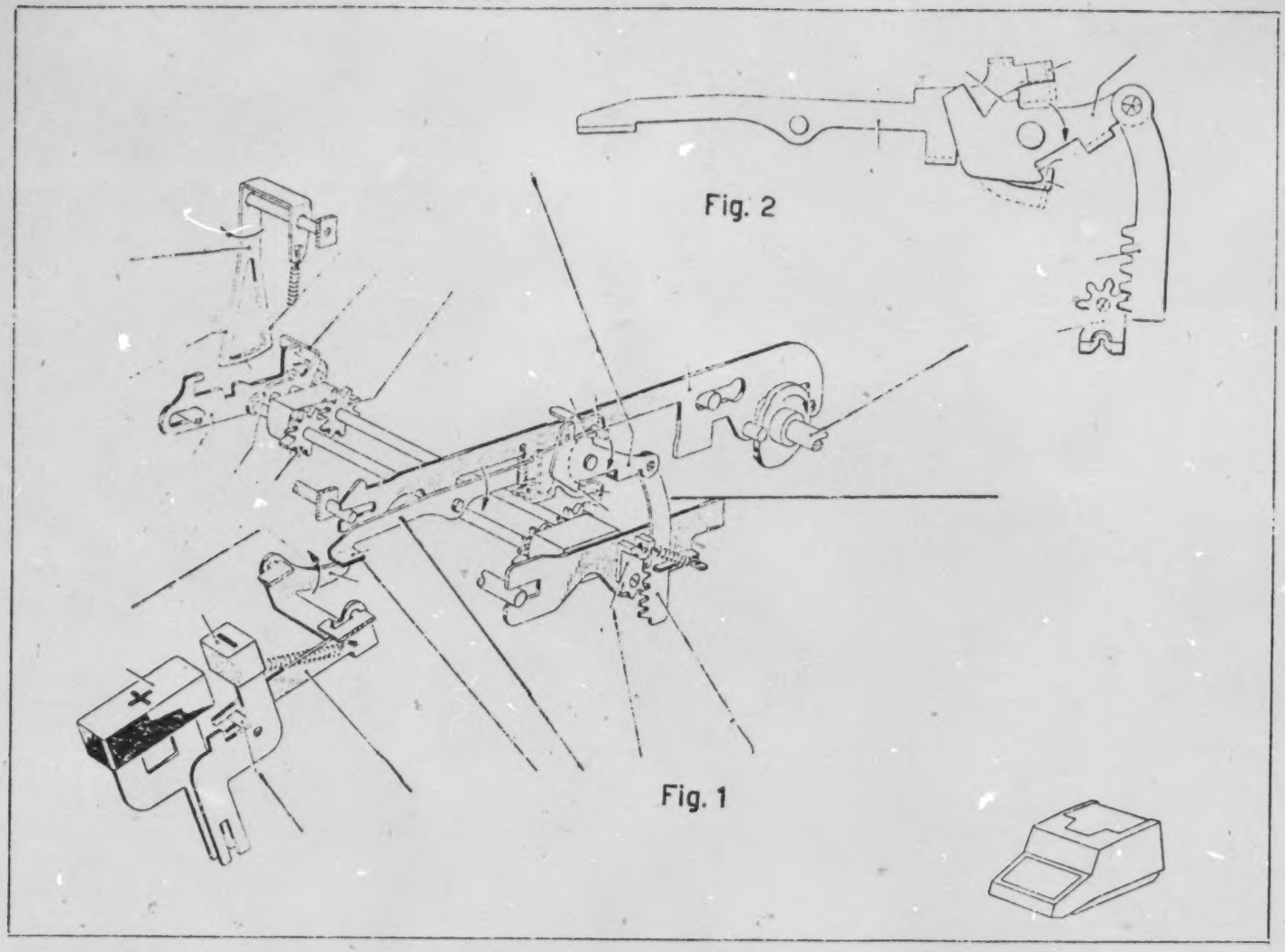


Fig. 2

Fig. 1

46.0 Criterion Measure

Disassemble, identify the parts, and reassemble the register inversion on an Olivetti adding machine.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

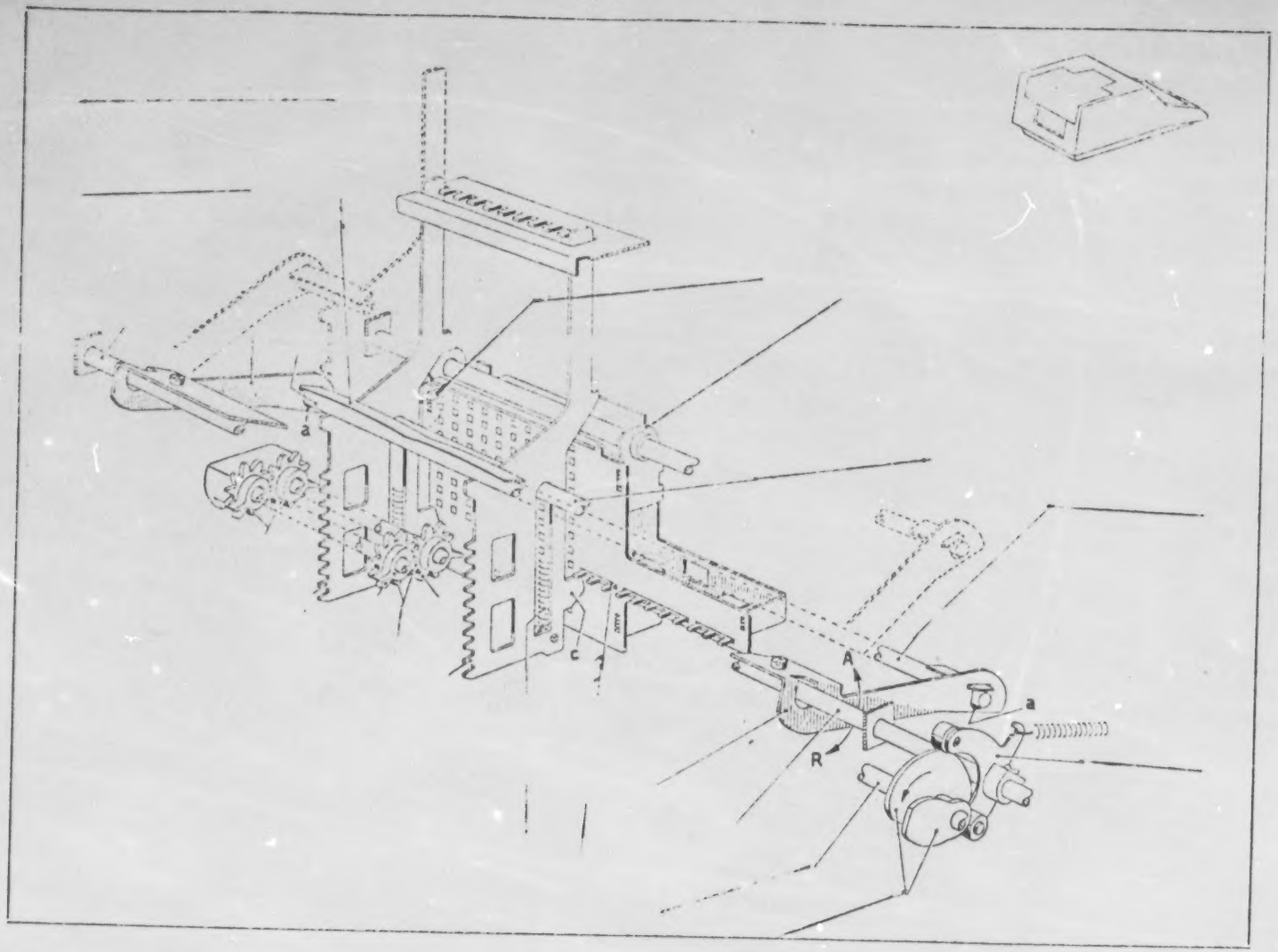
TERMINAL PERFORMANCE OBJECTIVE NO. 47.0

UNIVERSAL BAR

The student will disassemble, identify, and reassemble the universal bar assembly on an Olivetti Adding machine with 75% accuracy as judged by attached rating scale.

Selection of tools: 25%
Accuracy 50%
Speed 10%
Neatness 15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		47.0	See attached test.
47.1	Given a pictorial chart of the Universal Bar assembly, the student will correctly identify 10 of 13 parts.	47.1	Identify the 14 parts on the attached chart.
47.2	Given an Olivetti adding machine the student will remove and reinstall the universal bar with 75% accuracy.	47.2	Remove and reinstall the universal bar on an Olivetti adding machine. You will be graded on the following scale: Selection of tools: 25% Accuracy 50% Speed 10% Neatness 15%


a
c
A
a
R

47.0 Criterion Measure

Disassemble, identify the parts, and reassemble the universal bar assembly on an Olivetti adding machine.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

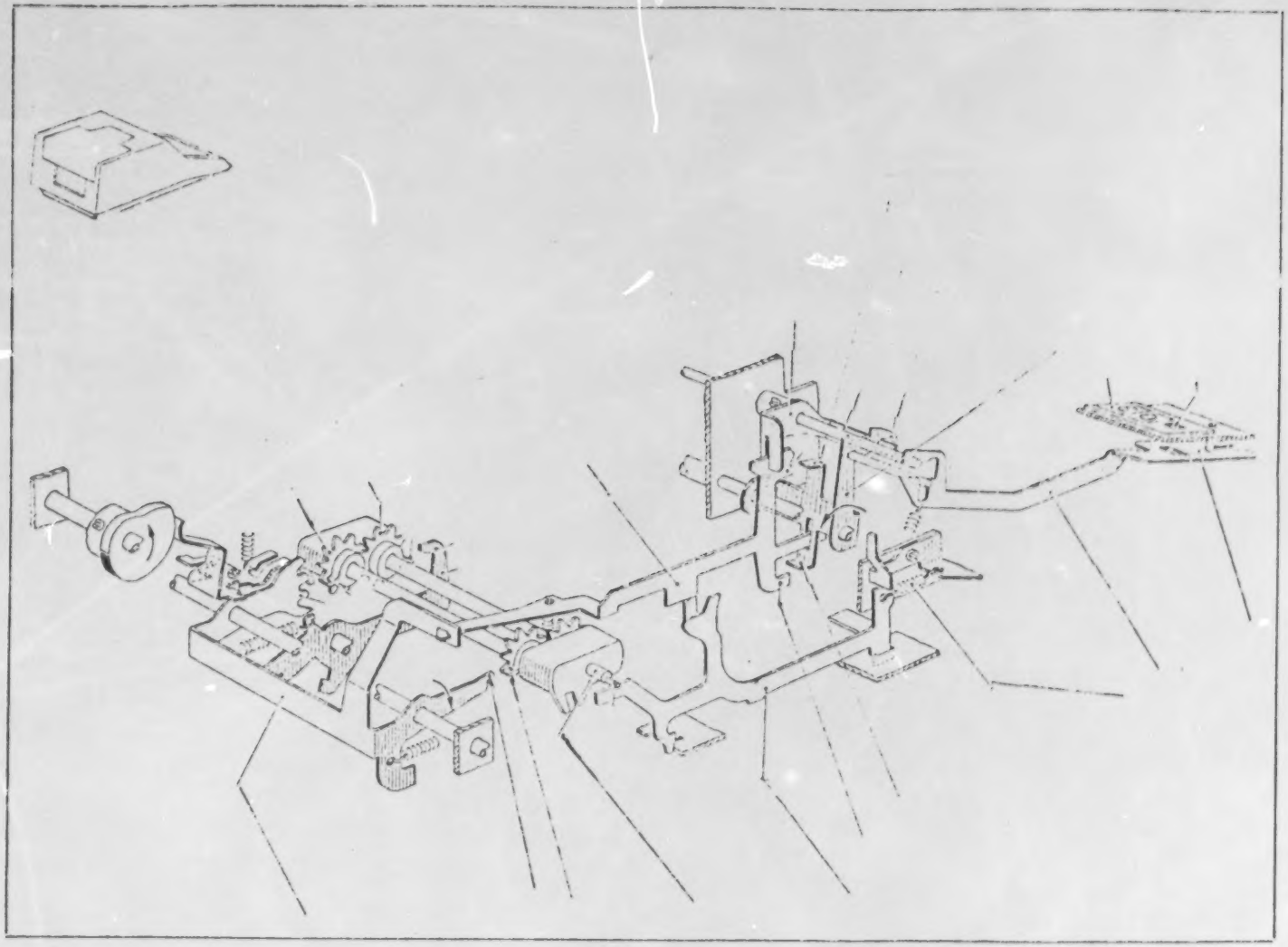
TERMINAL PERFORMANCE OBJECTIVE NO. 48.0

CREDIT BALANCE

The student will disassemble, identify, and reassemble the credit balance mechanism on an Olivetti adding machine with 75% accuracy as judged by attached rating scale.

Selection of tools:	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		48.0	See attached test.
48.1	Given a pictorial chart of the credit balance assembly, the student will correctly identify 15 of 20 parts	48.1	Identify the 20 parts on the attached chart.
48.2	Given an Olivetti adding machine the student will remove and reinstall the credit balance rocker with 75% accuracy.	48.2	Remove and reinstall the credit balance rocker on an Olivetti adding machine. You will be graded on the following scale: Selection of tools: 25% Accuracy 50% Speed 10% Neatness 15%



48.0 Criterion Measure

Disassemble, identify the parts, and reassemble the credit balance mechanism on an Olivetti adding machine.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

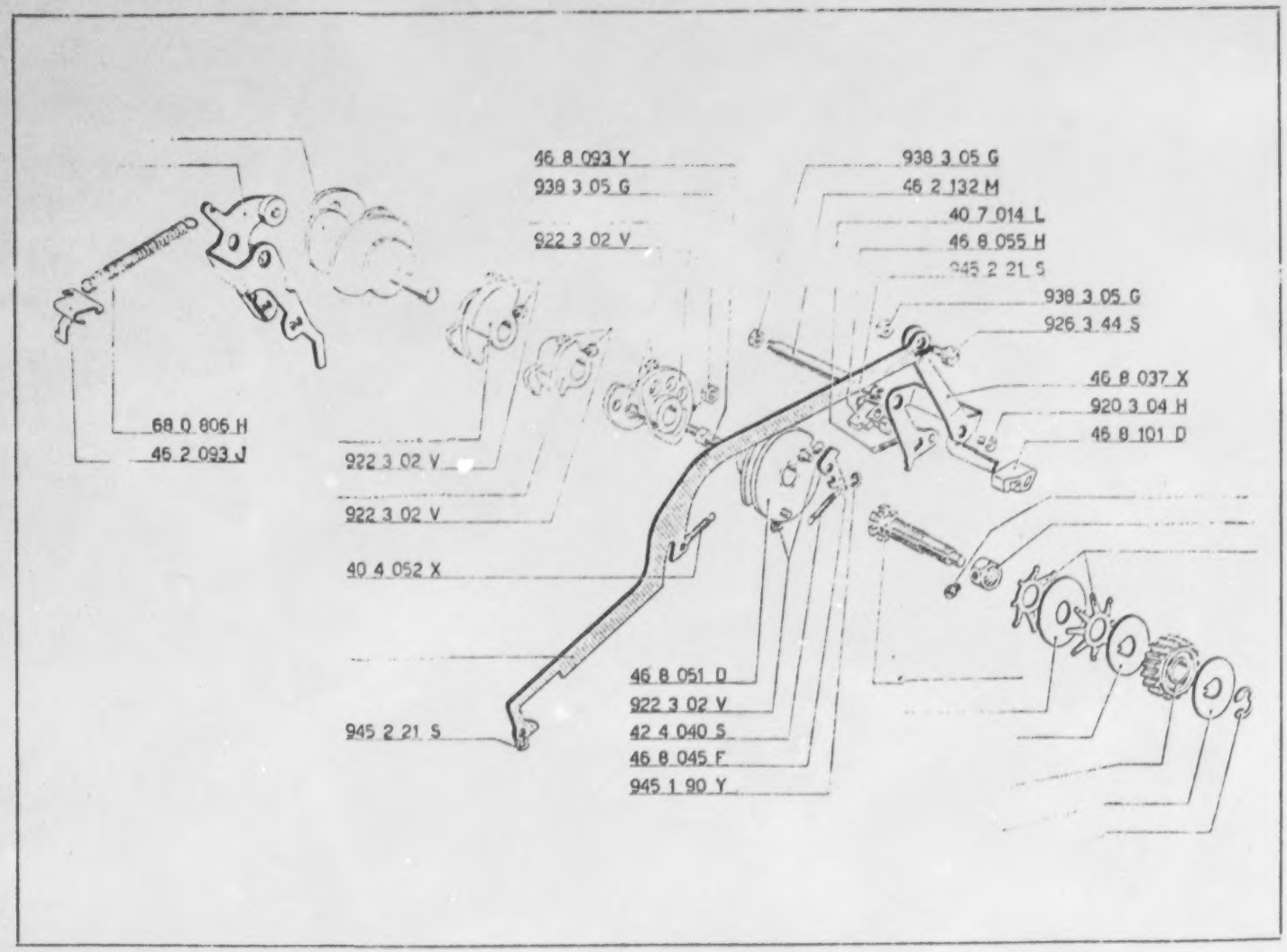
TERMINAL PERFORMANCE OBJECTIVE NO. 49.0

MAIN SHAFT & CLUTCH

The student will disassemble, identify, and reassemble the main shaft & clutch on an Olivetti adding machine with 75% accuracy as judged by attached rating scale.

Selection of tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		49.0	See attached test.
49.1	Given a pictorial chart of the main shaft & clutch assembly, the student will correctly identify 12 of 15 parts.	49.1	Identify the 15 parts on the attached chart.
49.2	Given an Olivetti adding machine, the student will remove and reinstall the clutch with 75% accuracy.	49.2	Remove and reinstall the clutch of an Olivetti adding machine. You will be graded on the following scale. Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%


46 8 093 Y
938 3 05 G
922 3 02 V
68 0 806 H
46 2 093 J
922 3 02 V
922 3 02 V
40 4 052 X
945 2 21 S
46 8 051 D
922 3 02 V
42 4 040 S
46 8 045 F
945 1 90 Y
938 3 05 G
46 2 132 M
40 7 014 L
46 8 055 H
945 2 21 S
938 3 05 G
926 3 44 S
46 8 037 X
920 3 04 H
46 8 101 D

49.0 Criterion Measure

Disassemble, identify the parts, and reassemble the main shaft and clutch on an Olivetti adding machine.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 50.0

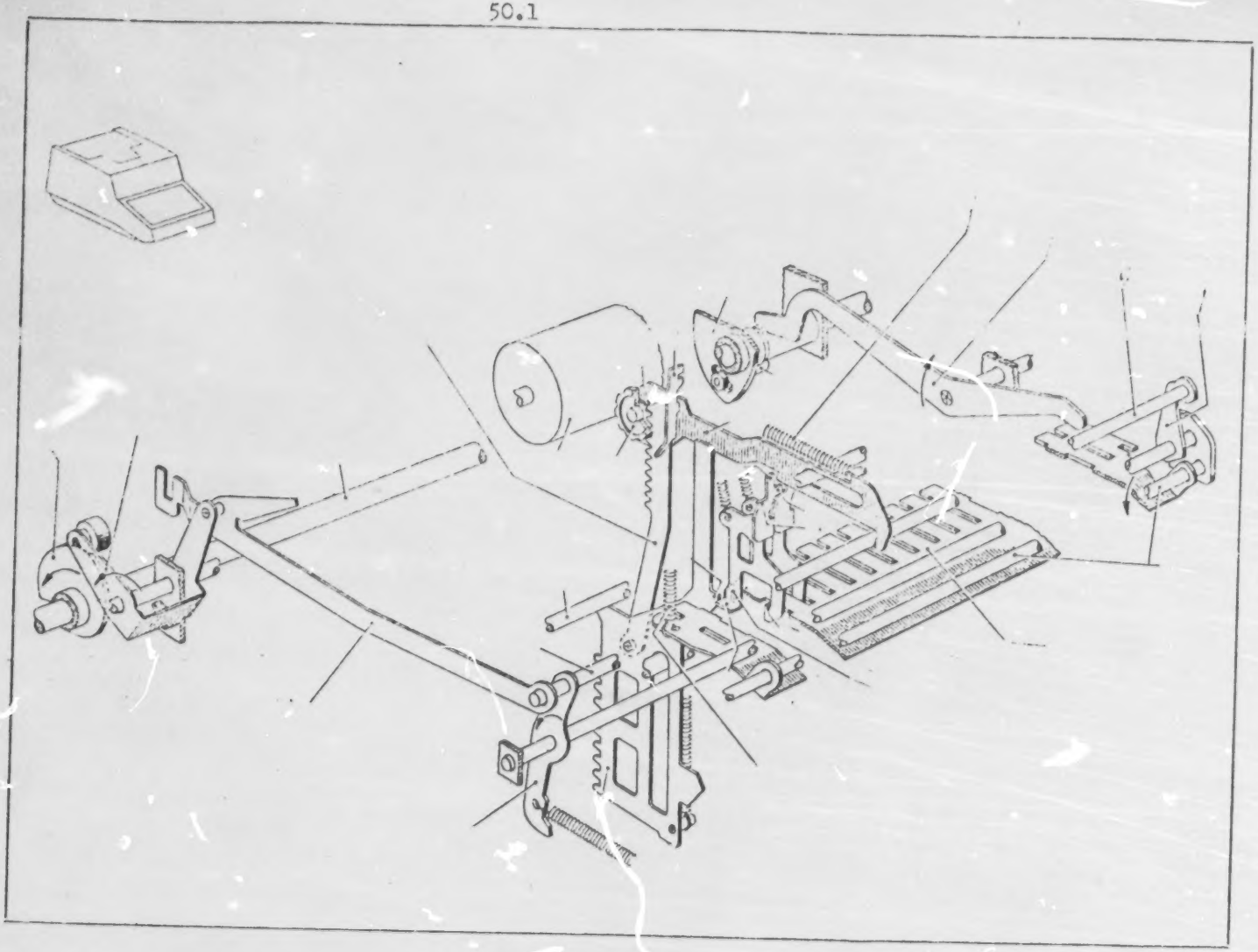
PRINTING MECHANISM

The student will disassemble, identify, and reassemble the printing mechanism on an Olivetti adding machine with 75% accuracy as judged by attached rating scale.

Selection of tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		50.0	See attached test.
50.1	Given a pictorial chart of the printing assembly, the student will correctly identify 13 of 18 parts.	50.2	Identify the 18 parts on the attached chart.
50.2	Given an Olivetti adding machine, the student will remove and reinstall the printing assembly with 75% accuracy.	50.2	Remove and reinstall the printing assembly on an Olivetti adding machine. You will be graded on the following scale: Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%

50.1



50.0 Criterion Measure

Disassemble, identify the parts, and reassemble the printing mechanism on an Olivetti adding machine.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

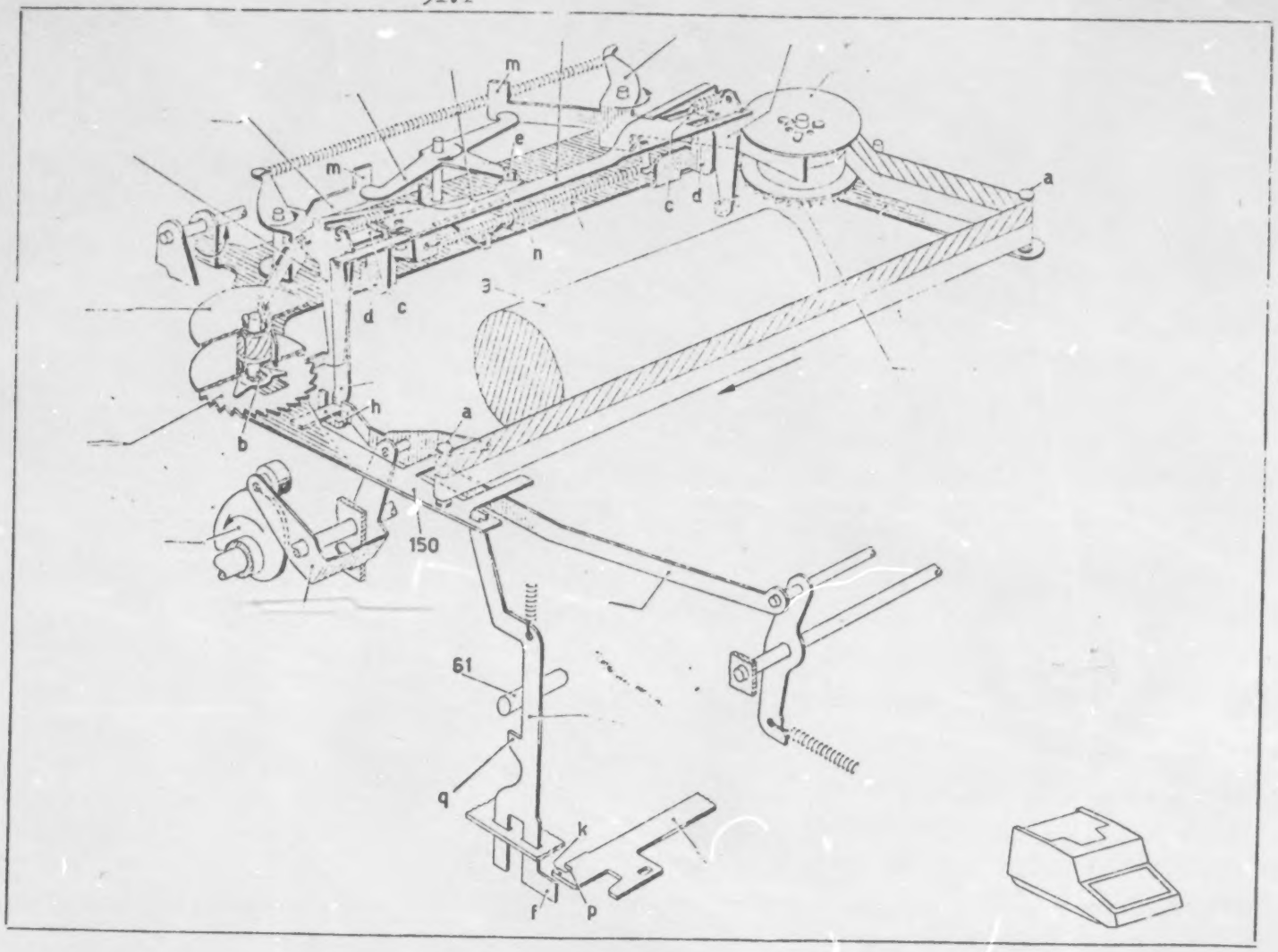
COURSE BUSINESS MACHINE MAINTENTANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 51.0 RIBBON ADVANCE AND REVERSE

The student will disassemble, identify, and reassemble the ribbon advance & reverse on an Olivetti adding machine with 75% accuracy as judged by attached rating scale.

Selection of tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		51.0	See attached test.
51.1	Given a pictorial chart of the ribbon advance assmebly, the student will correctly identify 12 of 16 parts.	51.1	Identify the 16 parts on the attached chart.
51.2	Given an Olivetti adding machine, the student will remove and reinstall the ribbon advance and reverse assembly with 75% accuracy.	51.2	Remove and reinstall the Ribbon advance & reverse assembly on an Olivetti adding machine. You will be graded on the following scale: Selection of Tools 25% Accuracy 50% Speed 10% Neatness 15%


m
e
m
e
a
c
d
n
3
d
c
h
a
b
150
61
q
k
f
p

51.0 Criterion Measure

Disassemble, identify the parts, and reassemble the ribbon advance and reverse on an Olivetti adding machine.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

COURSE BUSINESS MACHINE MAINTENANCE (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 52.0

LINE SPACING

Upon completion of the line spacing unit of instruction, the student will answer 75% of the attached criterion test correctly. In addition the student will disassemble, identify, and reassemble the line spacing mechanism on an Olivetti adding machine with 75% accuracy as judged by attached rating scale.

Selection of tools	25%	Neatness	15%
Accuracy	50%		
Speed	10%		

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		52.0	Test attached
52.1	Given a pictorial chart of the line space assembly, the student will correctly identify 9 of 12 parts.	52.1	Identify the 12 parts on the attached chart.
52.2	Given an Olivetti adding machine, the student will remove and reinstall the lir space assembly with 75% accuracy.	52.2	Remove and reinstall the line space assembly on an Olivetti adding machine. You will be graded on the following scale: Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%

52.0 Criterion Measure

Disassemble, identify the parts, and reassemble the line spacing mechanism on an Olivetti adding machine.

You will be graded as follows:

Selection of tools	- 25%
Accuracy	- 50%
Speed	- 10%
Neatness	- 15%

52.0 - CRITERION MEASURE

1. To add on the Olivetti adding machine, numbers are entered into the machine by:

   a. depressing numerical keys
   b. rotating the key stems
   c. inversion of the register

2. The calculation racks are powered upward by the:

   a. universal bar
   b. release of the stop section
   c. calculation rack springs

3. The register is composed of wheels that are:

   a. interlocking
   b. brought into mesh during total
   c. in mesh with the calculation racks all of the time

4. In rest position of the print wheels the figure (a. -zero), b. (1), c. (2) faces the platen

5. The first escapement stop is:

   a. spring loaded
   b. made solid
   c. split in half

6. The column indicator moves with the stop section and indicates how many digits have been entered in the:

   a. stop section
   b. register
   c. add wheels

7. The register is moved forward to engage the calculation racks when:

   a. the bar and calculation racks are at the top of their travel
   b. the register leaves the carry sectors
   c. the carries have been completed

8. Motor keys are held in a tripped condition by:

   a. motor trip crank
   b. clutch disc
   c. clutch dragging tooth

9. During an add cycle the calculation racks move upward until they are stopped by:

   a. a numerical stop that has been set
   b. limit of calculation rack spring
   c. the print wheel rotating as far as it will go

10. The calculation racks are restored to rest by:

    a. a spring
    b. restoring arm
    c. universal bar

11. The complement to 9 of any number is the difference between that number and 9. Find the complement to 9 of the numbers listed.

    Complement = 9 - the number

    _ = 9 - 8

    _ = 9 - 7

    _ = 9 - 6

    _ = 9 - 5

    _ = 9 - 4

    _ = 9 - 3

    _ = 9 - 2

    _ = 9 - 1

    _ = 9 - 0

12. When the register is engaged with either the calculation racks or the carry sectors, it is locked in a horizontal position by the:

    a. locking plate
    b. escapement plate
    c. stablizing lever

13. During a non-add cycle:

    a. the register does not move
    b. the calculation racks do not rise
    c. the stop section is half stepped

14. When the white flag disappears from the window, the operator knows there is:

    a. a credit balance in the register
    b. a debit balance in the register
    c. nothing in the register

15. As the operator performs a series of additions and subtractions, the result is accumulated:

    a. in the register
    b. in the print wheels
    c. in the stop section

16. During a total cycle, the register wheels are "engaged" with the calculation racks:

    a. before the calculation racks rise
    b. after the calculation racks reach the top and printing has occured
    c. all the time

17. During a total cycle the calculation racks rise until:

    a. the calculation racks limit against a set stop in the stop section
    b. the wide tooth of the register wheel limits against the transfer lever
    c. the wide tooth of the register limits against the carry sector

CIRCLE TRUE OR FALSE ON THE FOLLOWING

18. T F During a total cycle, the repeat lever is restored to rest position as the total key is depressed. Early in the total cycle the stop section is moved a half step to the left and the register inverted if necessary. Then, the register is engaged with the calculation racks before they begin to rise.

19. T F A print latch can only pull down the print latch to its right.

20. T F A primary carry always requires a secondary carry.

21. T F The register is made up of two rows of wheels with gear teeth which are on two parallel shafts so that they are always in mesh.

22. T F The two register wheels forming the first set on the right are the unit wheels, the second set are the tens wheels, the third set are the hundreds wheels, etc.

23. T F Each of the register wheels has one wide tooth which is the transfer tooth?

24. T F Each register wheel has nine teeth on it, one tooth for each digit from 0 through 9.

25. T F After the calculation racks have been restored the register is moved to the rear to engage with the carry sector.

26. T F As a primary carry is made into a column which is already at 9, the wide tooth of the subtract wheel will lower the next carry sector to the left to make a secondary carry.

27. T F The register only engages the carry sectors one during each add or subtract cycle.

28. T F When a subtotal is taken, the accumulation in the register prints on the tape, but the register is not cleared.

29. T F The only difference between taking a total and subtotal is in the register engagement.

30. T F The subtract symbol print latch is always hooked under the print vane.